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INVENTING SCHOOL MATHEMATICS

WORKBOOK



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E34
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CURR

Accompanying
AV material
at
QA 36.5
E3415 1969
CURR AV

Investigating School Mathematics

Workbook

ROBERT E. EICHOLZ

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CHARLES R. FLEENOR



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For Table of Contents,
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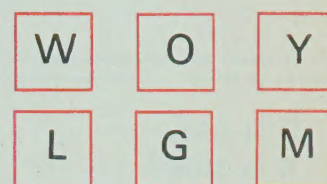
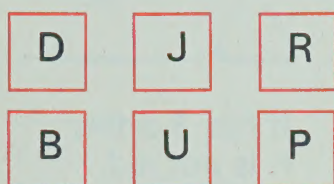
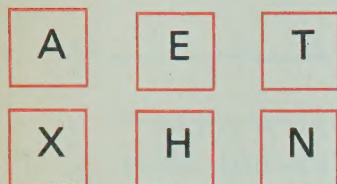
In each exercise you are given clues to help you figure out what special set of cards is involved. Study the clues and ring the cards on the far right that are in the set.

All of these
are in the set.

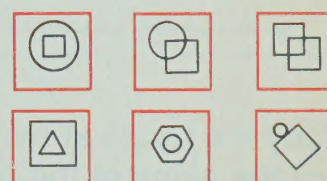
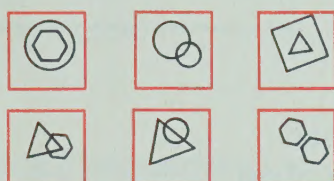
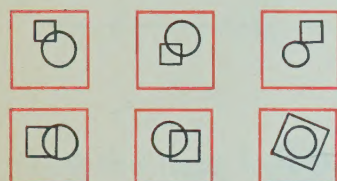
None of these
are in the set.

Which of these
are in the set?

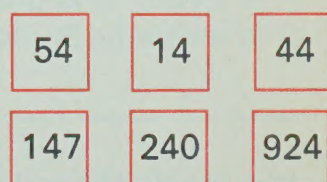
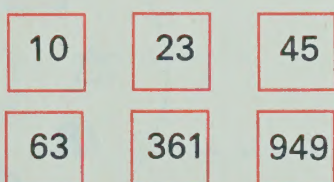
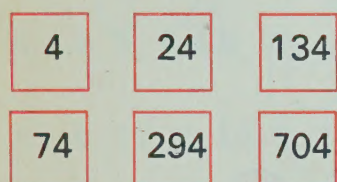
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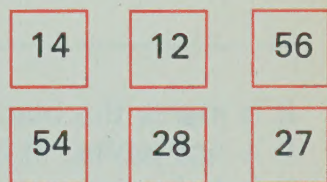
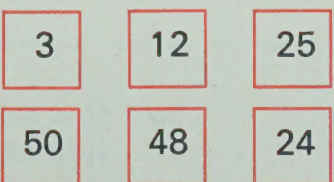
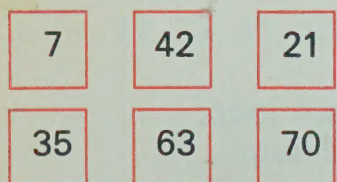
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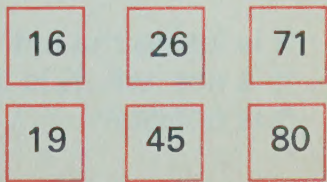
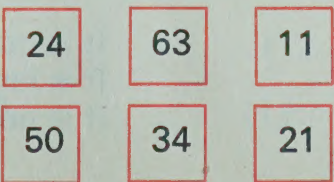
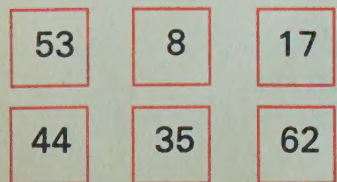
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4.



5.

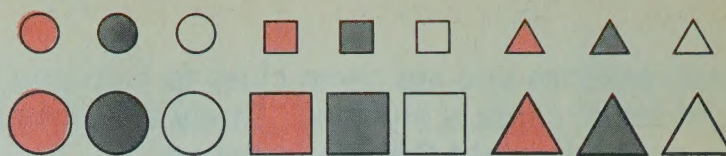


1. The figures at the right are either

large or small

red, gray, or white

circles, squares, or triangles.



Name the figure in each part.

A It is large.
It is red.
It has 3 sides.

B It has 4 sides.
It is white.
It is not large.

C It is gray.
It is small.
It has more than 3 sides.

D It is gray.
It is small.
It is not a square.
It is not a triangle.

E It has 3 sides.
It is not red.
It is not small.
It is not gray.

F It is a circle.
It is not white.
It is not large.
It is not gray.

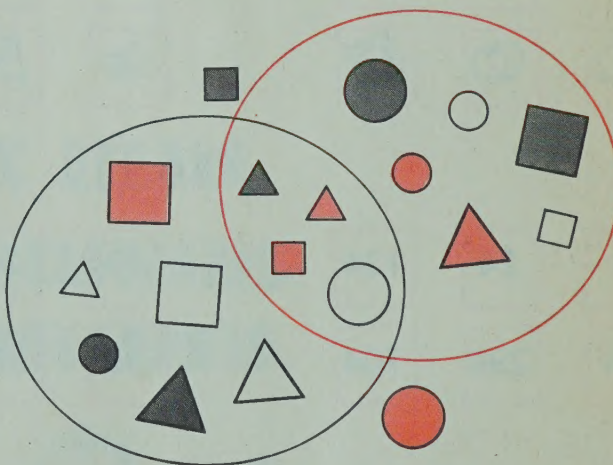
2. Study the figure at the right. Then give the name of the object described for each part.

A It is small. It is gray.
It is inside both loops.

B It is inside the red loop.
It is not red. It is not large.
It has 4 sides.

C It is inside the black loop.
It is not white. It is large.
It is not a square.

E It is inside the red loop.
It is not red. It is large.
It is not gray.



D It is not in the black loop.
It is not in the red loop.
It is not red.

F It is not in the red loop.
It is large. It is not red.
It is not a triangle.

1. Study the figure patterns. Then give the next two figures in each sequence.

A						_____	_____
B						_____	_____
C						_____	_____
D						_____	_____
E						_____	_____

2. Give the next four numbers in each sequence.

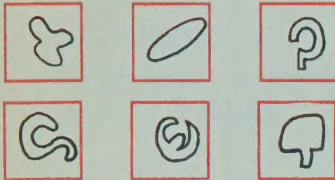
- A 3, 6, 9, 12, 15, _____, _____, _____, _____
- B 2, 5, 7, 10, 12, _____, _____, _____, _____
- C 6, 12, 7, 14, 8, 16, _____, _____, _____, _____
- D 70, 75, 74, 79, 78, _____, _____, _____, _____
- E 1, 12, 23, 34, 45, _____, _____, _____, _____

3. Study the patterns of the equations. Then give the next equation in each part.

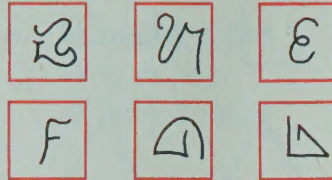
A	$(3 \times 37) + 12 = 123$	B	$(1 \times 8) + 1 = 9$
	$(6 \times 37) + 12 = 234$		$(12 \times 8) + 2 = 98$
	$(9 \times 37) + 12 = 345$		$(123 \times 8) + 3 = 987$
	_____ + _____ = _____		_____ + _____ = _____

1. Ring the cards on the far right that are in the set.

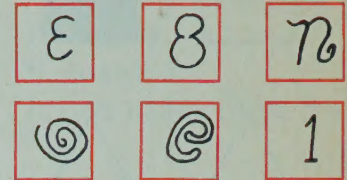
All of these
are in the set



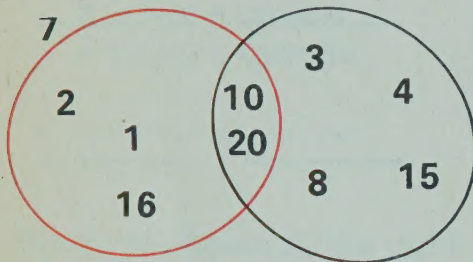
None of these
are in the set.



Which of these
are in the set?



2. Give the number for each part.



A It is in the black loop.
It is an even number.
It is larger than 15.

The number is _____.

B It is not in the red loop.
It is an odd number.
It is less than 5.

The number is _____.

3. Give the next two figures in this sequence.



4. Give the next three numbers in each sequence.

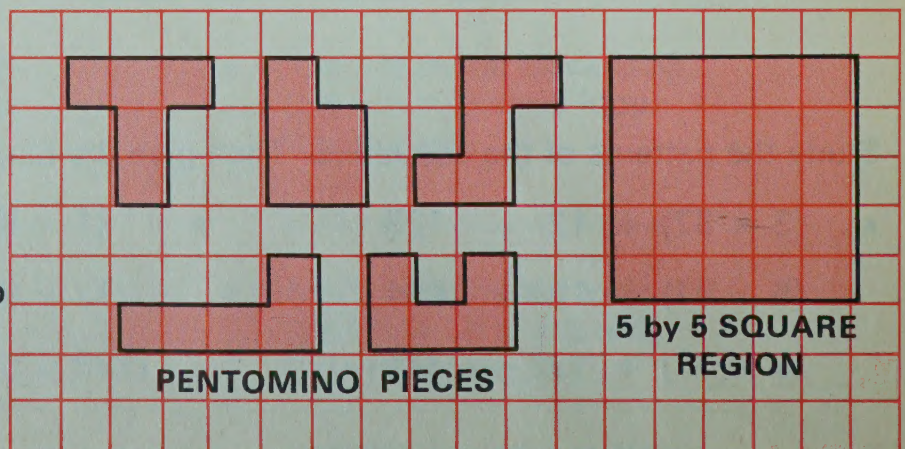
A 64, 32, 16, _____, _____, _____

B 3, 6, 5, 10, 9, _____, _____, _____

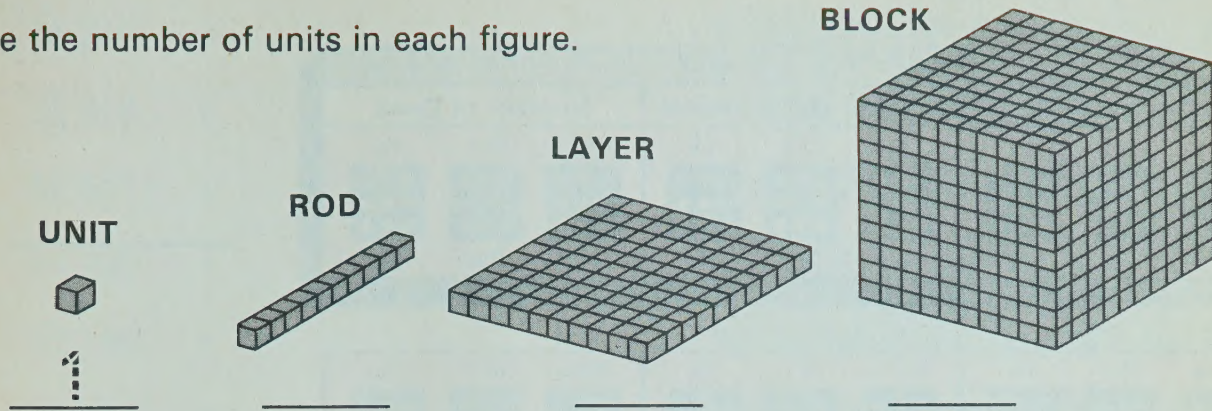
CHANGE of PACE

The five pentomino pieces can be placed so that they exactly cover the 5 by 5 square region.

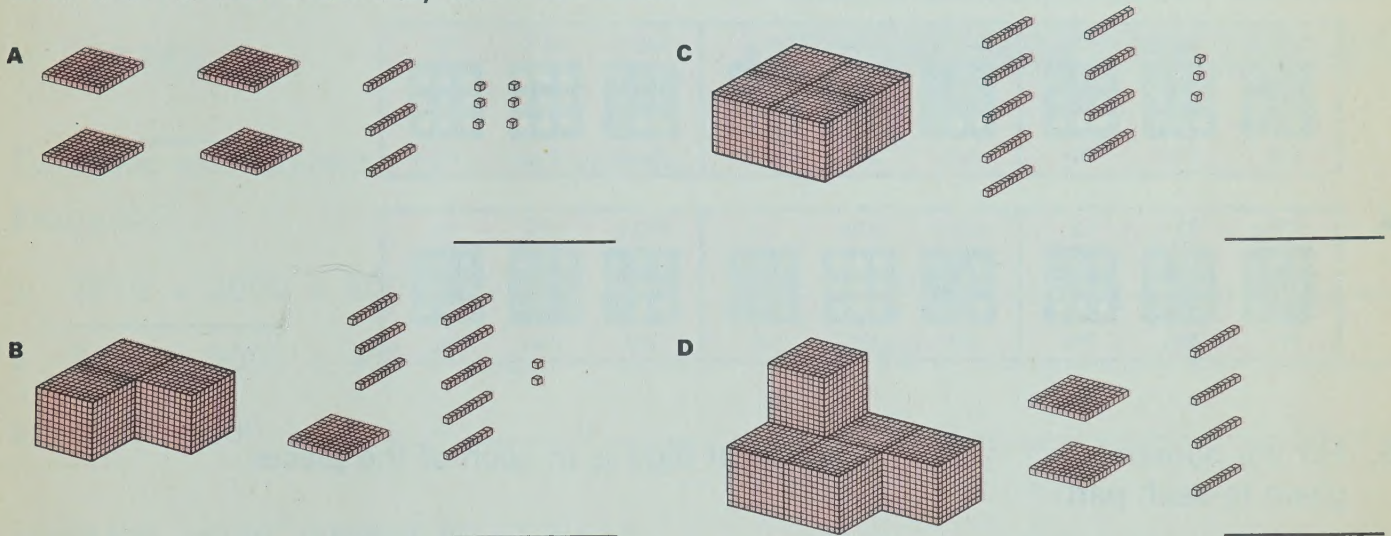
Make your own pentomino pieces from graph paper and then try to cover the square region.



1. Give the number of units in each figure.



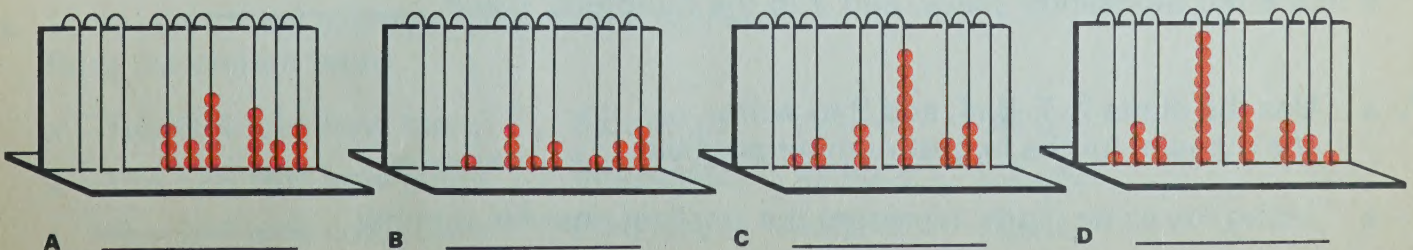
2. Give the number shown by each set below.



3. Give the number for each of these.

- A** 3 blocks, 4 layers, 5 rods, 2 units _____
- B** 7 blocks, 1 rod, 3 units _____
- C** 6 layers, 9 rods _____

4. Give the number shown by each abacus below.



For exercises 1 through 4, give the number the base-ten machine was signaled to remember.

1.

BASE-TEN MACHINE								
Number of Millions			Number of Thousands			Number of Ones		
100's	10's	1's	100's	10's	1's	100's	10's	1's
9th	8th	7th	6th	5th	4th	3rd	2nd	1st

2.

100's	10's	1's	100's	10's	1's	100's	10's	1's
9th	8th	7th	6th	5th	4th	3rd	2nd	1st

3.

100's	10's	1's	100's	10's	1's	100's	10's	1's
9th	8th	7th	6th	5th	4th	3rd	2nd	1st

4.

100's	10's	1's	100's	10's	1's	100's	10's	1's
9th	8th	7th	6th	5th	4th	3rd	2nd	1st

5. For the numeral **627 514 389**, tell what digit is in each of the places given in each part.

- A 4 is in the thousands' place. E _____ is in the tens' place.
- B _____ is in the hundreds' place. F _____ is in the millions' place.
- C _____ is in the ten thousands' place. G _____ is in the hundred millions' place.
- D _____ is in the ones' place. H _____ is in the ten millions' place.

6. Write a numeral that has 6 in the tens' place, 9 in the thousands' place, 0 in the ones' place, 5 in the ten thousands' place, and 2 in the hundreds' place. _____

7. A Use the digits 2, 7, 3, 4, and 9 to write the numeral for the largest number possible. _____
- B Using the same digits, represent the smallest possible number. _____

1. Complete the matching.

A	36 218	•	30 000 + 8000 + 200 + 10 + 6
B	38 216	•	30 000 + 6000 + 200 + 10 + 8
C	32 861	•	30 000 + 1000 + 800 + 60 + 2
D	31 286	•	30 000 + 1000 + 200 + 80 + 6
E	32 168	•	30 000 + 2000 + 800 + 60 + 1
F	38 612	•	30 000 + 6000 + 100 + 80 + 2
G	31 862	•	30 000 + 2000 + 100 + 60 + 8
H	36 182	•	30 000 + 8000 + 600 + 10 + 2

2. Complete each equation as in the example.

Example: $7284 = 7000 + 200 + 80 + 4$

A	$2615 = 2000 + 600 + 10 + \underline{\hspace{2cm}}$	D	$9326 = \underline{\hspace{2cm}}$
B	$3487 = 3000 + 400 + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$	E	$8403 = \underline{\hspace{2cm}}$
C	$6492 = 600 + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$	F	$7620 = \underline{\hspace{2cm}}$

3. Write the "usual" numeral for each part.

A	$(3 \times 1000) + (2 \times 100) + (6 \times 10) + 8 = \underline{3268}$
B	$(5 \times 10\,000) + (3 \times 1000) + (8 \times 100) + (7 \times 10) + 5 = \underline{\hspace{2cm}}$
C	$(6 \times 10\,000) + (2 \times 1000) + (3 \times 10) + 4 = \underline{\hspace{2cm}}$
D	$(9 \times 100\,000) + (6 \times 10\,000) + (4 \times 1000) = \underline{\hspace{2cm}}$
E	$(3 \times 10\,000) + (2 \times 1000) + (4 \times 100) + (2 \times 10) + 9 = \underline{\hspace{2cm}}$

4. Each part of this exercise refers to the numeral **237 684 928 631**.
Ring the correct word.

A	The 684 tells how many	thousands	millions	billions.
B	The 928 tells how many	thousands	millions	billions.
C	The 237 tells how many	thousands	millions	billions.

1. Ring the larger of each pair of numbers.

A 328; 338

E 57 463; 57 399

I 346 287; 346 381

B 6295; 6285

F 64 088; 64 100

J 295 641; 295 595

C 3407; 3507

G 32 517; 32 600

K 1 342 631; 1 242 631

D 28 641; 28 631

H 78 461; 77 989

L 3 746 517; 3 745 888

2. Write **less** or **greater** in each blank.


A 4268 is _____ than 4368.


C 96 521 is _____ than 76 499.


B 7641 is _____ than 7541.


D 83 426 is _____ than 83 419.


3. Write the correct sign (< or >) in each


A 472  462


G 7264  7364


M 62 834  62 777


B 829  831


H 8301  8311


N 93 461  93 508


C 576  581


I 7652  7552


O 176 210  176 209


D 692  899


J 9344  9361


P 384 791  384 800


E 834  934

K 7655  7654

Q 4 090 000  3 089 899

F 976  981

L 8217  8220

R 3 664 231  7 664 230

4. Write 10, 100, 1000, or 10 000 in each blank.

A $6284 = 6274 + \underline{\hspace{2cm}}$

G $62\,431 = 61\,431 + \underline{\hspace{2cm}}$

B $5432 = 5532 - \underline{\hspace{2cm}}$

H $92\,837 = 92\,937 - \underline{\hspace{2cm}}$

C $6701 = 6601 + \underline{\hspace{2cm}}$

I $84\,601 = 74\,601 + \underline{\hspace{2cm}}$

D $9280 = 9290 - \underline{\hspace{2cm}}$

J $75\,328 = 85\,328 - \underline{\hspace{2cm}}$


E $7776 = 8776 - \underline{\hspace{2cm}}$

K $964\,371 = 965\,371 - \underline{\hspace{2cm}}$


F $9284 = 8284 + \underline{\hspace{2cm}}$


L $921\,649 = 921\,549 + \underline{\hspace{2cm}}$

5. Write the correct sign (<, =, or >) in each

A $6283 \text{  } 6000 + 100 + 80 + 3$

C $836\,284 \text{  } 830\,000 + 7000$


B $7469 \text{  } 7000 + 500 + 60 + 9$

D $926\,034 \text{  } 92\,000 + 6000 + 34$

1. Draw rings to group the sticks as indicated. Then fill in the blanks.

A

In **BASE TEN** group by **tens**:



_____ ten and _____
We write _____

B


In **BASE FOUR** group by **fours**:



_____ fours and _____
We write _____(4).


2. Group by **fours**. Fill in the blanks correctly.

A




_____ fours and _____
We write _____(4).

D




_____ fours and _____
We write _____(4).

B




_____ four and _____
We write _____(4).

E




_____ fours and _____
We write _____(4).

C



_____ fours and _____
We write _____(4).

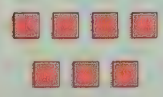
F



_____ fours and _____
We write _____(4).

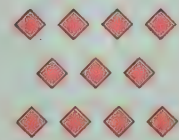
3. Write a base-four numeral for the number of objects in each set.

A



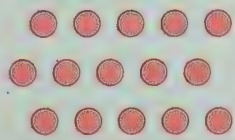
_____ (4)

B




_____ (4)

C



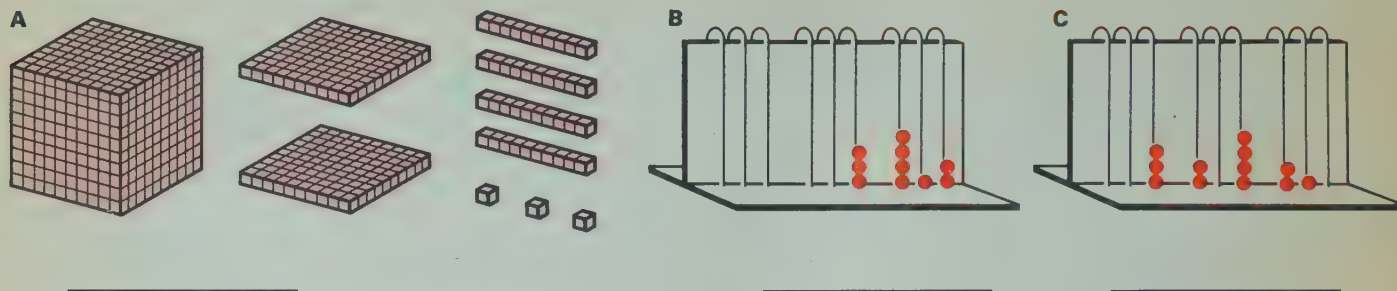
_____ (4)

D



_____ (4)

1. Write the correct numeral for each picture.



2. Complete each equation as in the example.

Example: $2698 = 2000 + 600 + 90 + 8$

A $3648 =$ _____


B $36429 =$ _____

3. Give the correct sign ($<$ or $>$) in each .

A 68  58


D 326  426


G 8461  8399


B 74  84

E 7642  7542

H 13399  13400

C 269  259

F 9164  9200

I 484621  486421

CHANGE OF PACE

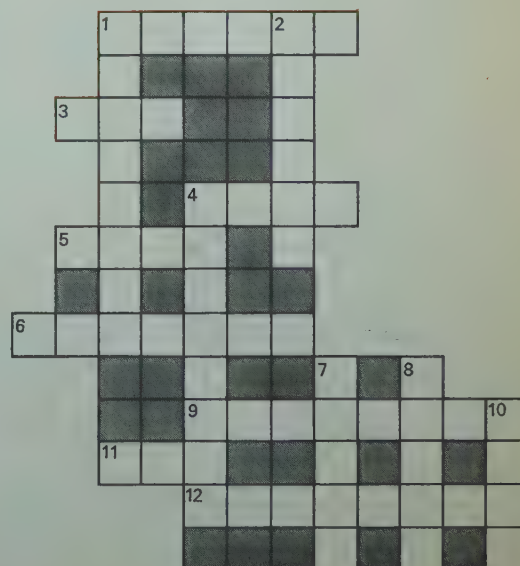
Use the **word** name for each number.

Across

- In 3426, the 2 stands for $__?$.
- Half a dozen
- Number of eights in 40
- $63 - (7 \times 9)$
- In 5172, the 1 stands for $1__?$.
- 3 sixes
- The smallest odd number
- 1900 is the same as $__?$ hundred.

Down

- Three more than $7268 - 7258$
- Number of months in a year
- $13 < __? < 15$
- $1000 - 997$
- Number of days in a week
- $(9 \times 7) \div 7 = __?$



3

Equations and Operations

Solving Problems

For exercises 1 through 9, use **A**, **S**, **M**, or **D** to tell which operation (**A**ddition, **S**ubtraction, **M**ultiplication, or **D**ivision) you would use to solve the problem.

1. John weighs ■■■■ kilograms and Jim weighs ■■ kilograms. On the scales together, how many kilograms _____

2. Ann has ■■■■ cents and Sue has ■■■■ cents. How much more does Sue have? _____



3. ■■■■ bottles of soda. ■■■■ ml in each bottle. How many ml in all? _____
4. Drove ■■ kilometres the first day and ■■ kilometres the second. How far in all? _____

5. Had ■■■■ balloons. Gave same number to each of ■■■■ children. How many did each child get? _____

6. ■■■■ children. ■■■■ girls. How many boys? _____

7. ■■■■ pieces of candy. Ate ■■■■ pieces. How many are left? _____



8. ■■■■ chairs. ■■■■ in each row. How many rows? _____
9. ■■■■ rows of chairs with ■■■■ in each row. How many chairs? _____

For exercises 10 through 15, solve each problem.

10. Liz and Betty have 57 cents in all. Only 7 cents belong to Liz. How much belongs to Betty? _____



11. Alex has 8 nickels. They are worth how many cents? _____
12. How many days are in 6 weeks? _____

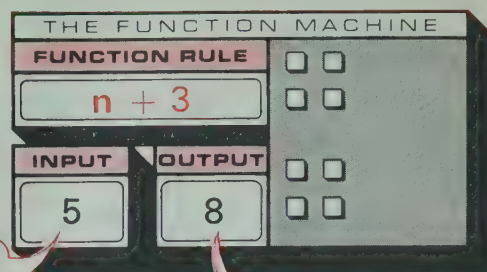
13. Tom has 8 stamps on each page of his stamp book. There are 64 stamps in the book. How many pages are in the book? _____

14. Eric has 124 baseball cards and his little brother has 10. How many cards do the boys have in all? _____

15. Frank needs 10 more coins to complete his collection. He will then have 126 coins. How many does he have now? _____

1. Think about the function machine to complete each sentence.

- A When the input number n is 6,
the output number is ____.
- B When the input number n is 9,
the output number is ____.
- C When n is 7, $n + 3$ is ____.



input
number

input
number + 3

2. Use the function rule $n + 7$ to find the output numbers for each of these input numbers.

- A 6, 13 C 5, ____ E 9, ____ G 0, ____
- B 3, ____ D 7, ____ F 4, ____ H 13, ____

3. Find the output for the input number and function rule given in each part.

- A $n = 2, n + 5 = \underline{7}$ D $n = 1, n + n = \underline{\quad}$
- B $n = 7, n - 4 = \underline{\quad}$ E $n = 15, n \div 3 = \underline{\quad}$
- C $n = 4, 2 \times n = \underline{\quad}$ F $n = 9, n - 9 = \underline{\quad}$

4. Give the missing output numbers in each function table.

A Function rule

$n + 5$	
n	Output
5	10
10	
7	
16	

B Function rule

$4 \times n$	
n	Output
5	20
7	
2	
0	

C Function rule

$n - 3$	
n	Output
4	1
6	
9	
13	

D Function rule

$n \div 2$	
n	Output
8	4
4	
2	
18	

1. Find each difference.

A To find this difference, think $? + 6 = 11$. $11 - 6 = \square$

B To find this difference, think $? + 9 = 14$. $14 - 9 = \square$



2. Find each difference by first finding the missing addend.

A $\square + 7 = 15$

$15 - 7 = \square$

B $\square + 4 = 12$

$12 - 4 = \square$

C $\square + 5 = 13$

$13 - 5 = \square$

3. Find the differences.

A $12 - 5 = \underline{\hspace{2cm}}$

D $11 - 6 = \underline{\hspace{2cm}}$

G $11 - 4 = \underline{\hspace{2cm}}$

B $13 - 5 = \underline{\hspace{2cm}}$

E $10 - 4 = \underline{\hspace{2cm}}$

H $12 - 6 = \underline{\hspace{2cm}}$

C $13 - 4 = \underline{\hspace{2cm}}$

F $14 - 9 = \underline{\hspace{2cm}}$

I $15 - 6 = \underline{\hspace{2cm}}$

4. Find each quotient.

A $24 \div 6 = \square$ To find this quotient, think $? \times 6 = 24$.

B $35 \div 5 = \square$ To find this quotient, think $? \times 5 = 35$.

5. Find each quotient by first finding the missing factor.

A $\square \times 9 = 36$

$36 \div 9 = \square$

B $\square \times 6 = 42$

$42 \div 6 = \square$

C $\square \times 4 = 32$

$32 \div 4 = \square$

6. Find the quotients.

A $32 \div 8 = \underline{\hspace{2cm}}$

D $42 \div 7 = \underline{\hspace{2cm}}$

G $56 \div 7 = \underline{\hspace{2cm}}$

B $35 \div 5 = \underline{\hspace{2cm}}$

E $24 \div 8 = \underline{\hspace{2cm}}$

H $72 \div 8 = \underline{\hspace{2cm}}$

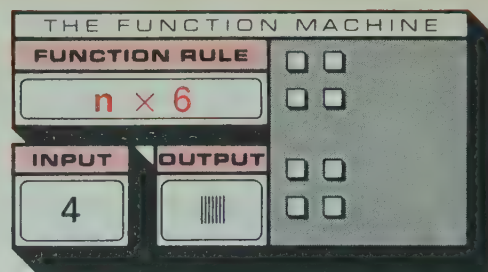
C $36 \div 6 = \underline{\hspace{2cm}}$

F $45 \div 5 = \underline{\hspace{2cm}}$

I $63 \div 9 = \underline{\hspace{2cm}}$

1. Find the output number for each input number. Use the rule shown on the function machine.

	input	output		input	output
A	4	_____	B	7	_____
	input	output		input	output
C	9	_____	D	5	_____



Find the missing input or output numbers.

2. Function rule

	$n + 9$														
	<table><tr><th>n</th><th>Output</th></tr><tr><td>6</td><td>15</td></tr><tr><td>3</td><td></td></tr><tr><td>8</td><td></td></tr><tr><td>5</td><td></td></tr><tr><td></td><td>11</td></tr><tr><td></td><td>16</td></tr></table>	n	Output	6	15	3		8		5			11		16
n	Output														
6	15														
3															
8															
5															
	11														
	16														
A															
B															
C															
D															
E															

3. Function rule

	$n \times 8$														
	<table><tr><th>n</th><th>Output</th></tr><tr><td>3</td><td>24</td></tr><tr><td>7</td><td></td></tr><tr><td>9</td><td></td></tr><tr><td>8</td><td></td></tr><tr><td></td><td>40</td></tr><tr><td></td><td>0</td></tr></table>	n	Output	3	24	7		9		8			40		0
n	Output														
3	24														
7															
9															
8															
	40														
	0														
A															
B															
C															
D															
E															

4. Function rule

	$16 - n$														
	<table><tr><th>n</th><th>Output</th></tr><tr><td>15</td><td>1</td></tr><tr><td>8</td><td></td></tr><tr><td>9</td><td></td></tr><tr><td>4</td><td></td></tr><tr><td></td><td>16</td></tr><tr><td></td><td>9</td></tr></table>	n	Output	15	1	8		9		4			16		9
n	Output														
15	1														
8															
9															
4															
	16														
	9														
A															
B															
C															
D															
E															

5. Function rule

	$n \div 6$														
	<table><tr><th>n</th><th>Output</th></tr><tr><td>24</td><td>4</td></tr><tr><td>54</td><td></td></tr><tr><td>30</td><td></td></tr><tr><td>42</td><td></td></tr><tr><td></td><td>3</td></tr><tr><td></td><td>1</td></tr></table>	n	Output	24	4	54		30		42			3		1
n	Output														
24	4														
54															
30															
42															
	3														
	1														
A															
B															
C															
D															
E															

Give the missing function rules.

6. Function rule

	<table><tr><th>n</th><th>Output</th></tr><tr><td>3</td><td>10</td></tr><tr><td>8</td><td>15</td></tr><tr><td>9</td><td>16</td></tr><tr><td>4</td><td>11</td></tr></table>	n	Output	3	10	8	15	9	16	4	11
n	Output										
3	10										
8	15										
9	16										
4	11										

7. Function rule

	<table><tr><th>n</th><th>Output</th></tr><tr><td>4</td><td>12</td></tr><tr><td>7</td><td>21</td></tr><tr><td>1</td><td>3</td></tr><tr><td>9</td><td>27</td></tr></table>	n	Output	4	12	7	21	1	3	9	27
n	Output										
4	12										
7	21										
1	3										
9	27										

8. Function rule

	<table><tr><th>n</th><th>Output</th></tr><tr><td>32</td><td>8</td></tr><tr><td>20</td><td>5</td></tr><tr><td>16</td><td>4</td></tr><tr><td>8</td><td>2</td></tr></table>	n	Output	32	8	20	5	16	4	8	2
n	Output										
32	8										
20	5										
16	4										
8	2										

9. Function rule

	<table><tr><th>n</th><th>Output</th></tr><tr><td>7</td><td>4</td></tr><tr><td>12</td><td>9</td></tr><tr><td>3</td><td>0</td></tr><tr><td>20</td><td>17</td></tr></table>	n	Output	7	4	12	9	3	0	20	17
n	Output										
7	4										
12	9										
3	0										
20	17										

1. Solve the equations.

A $n + 6 = 9$

$n = \underline{3}$

E $9 \times b = 18$

$b = \underline{\quad}$

I $6 + 9 = p$

$p = \underline{\quad}$

M $6 \times n = 36$

$n = \underline{\quad}$

B $3 \times n = 12$

$n = \underline{4}$

F $12 = 2 \times r$

$r = \underline{\quad}$

J $35 = y \times 5$

$y = \underline{\quad}$

N $5 \times 9 = b$

$b = \underline{\quad}$

C $a \times 5 = 20$

$a = \underline{\quad}$

G $17 = 8 + c$

$c = \underline{\quad}$

K $18 = 6 \times m$

$m = \underline{\quad}$

O $a + 8 = 16$

$a = \underline{\quad}$

D $7 + b = 13$

$b = \underline{\quad}$

H $5 \times 7 = q$

$q = \underline{\quad}$

L $r + 8 = 15$

$r = \underline{\quad}$

P $40 = c \times 8$

$c = \underline{\quad}$

2. Solve the equations.

A $(2 \times 4) + 5 = n$

$n = \underline{\quad}$

E $(2 \times 3) + c = 10$

$c = \underline{\quad}$

I $(t \times 2) + 1 = 5$

$t = \underline{\quad}$

B $(6 \times 3) + 3 = a$

$a = \underline{\quad}$

F $(5 \times 3) + d = 16$

$d = \underline{\quad}$

J $(q \times 3) + 3 = 9$

$q = \underline{\quad}$

C $(2 \times 9) + 6 = c$

$c = \underline{\quad}$

G $(8 \times 1) + a = 10$

$a = \underline{\quad}$

K $(z \times 4) + 2 = 6$

$z = \underline{\quad}$

D $(5 \times 7) + 7 = b$

$b = \underline{\quad}$

H $(2 \times 9) + m = 20$

$m = \underline{\quad}$

L $(y \times 7) + 6 = 6$

$y = \underline{\quad}$

3. Write an equation for each problem. Then solve the equation.

- A Kent shot 8 arrows at a target. Then Kent's friend shot 5 arrows. How many arrows were shot?

Equation: $\underline{\hspace{2cm}}$

Solution: $\underline{\hspace{2cm}}$

- B Patti played 3 long playing records. Each record had 8 songs on it. Then she played 4 more songs. How many songs did she play in all?

Equation: $\underline{\hspace{2cm}}$

Solution: $\underline{\hspace{2cm}}$

1. Match each equation with the name of the principle it illustrates.

- | | | |
|---|---|---|
| A | $23 + 86 = 86 + 23$ | • + Zero principle |
| B | $92 + (7 + 18) = (92 + 7) + 18$ | • \times One principle |
| C | $659 + 0 = 659$ | • + Commutative (order) principle |
| D | $16 + (32 + 8) = (16 + 32) + 8$ | • \times Commutative (order) principle |
| E | $659 \times 1 = 659$ | • + Associative (grouping) principle |
| F | $(19 \times 31) \times 4 = 19 \times (31 \times 4)$ | • \times Associative (grouping) principle |
| G | $23 \times 86 = 86 \times 23$ | |

2. Solve the equations.

Using the commutative principles

- A Since $683 + 476 = 1159$, we know that $476 + 683 = \underline{\hspace{2cm}}$
- B Since $67 \times 94 = 6298$, we know that $94 \times 67 = \underline{\hspace{2cm}}$

Using the associative principles

- C Since $(92 + 61) + 38 = 191$, we know that $92 + (61 + 38) = \underline{\hspace{2cm}}$
- D Since $(28 \times 16) \times 7 = 3136$, we know that $28 \times (16 \times 7) = \underline{\hspace{2cm}}$

Using both the commutative and associative principles

- E Since $43 + 92 + 84 + 7 = 226$,
we know that $84 + 43 + 7 + 92 = \underline{\hspace{2cm}}$.
- F Since $8 \times 7 \times 6 \times 9 = 3024$, we know that $9 \times 6 \times 8 \times 7 = \underline{\hspace{2cm}}$.

3. Solve the equations.

- A Since $96 \times 71 = 6816$, we know that $71 \times \underline{\hspace{1cm}} = 6816$.
- B Since $(13 \times 6) \times 2 = 156$, we know that $\underline{\hspace{1cm}} \times (6 \times 2) = 156$.
- C Since $21 + 6 + 19 + 40 = 96$, we know that $21 + 6 + \underline{\hspace{1cm}} + 50 = 96$.
- D $967 \times \underline{\hspace{1cm}} = 967$
- E $59 + \underline{\hspace{1cm}} = 59$

1. The pictures below will help you understand the **multiplication-addition principle**. You can think of this principle as “breaking apart” a factor before you multiply. Study the pictures. Then complete the equations.

A

$$6 \times 3 = (4 + 2) \times 3 = (4 \times 3) + (\underline{\quad} \times 3)$$

B

$$3 \times 5 = 3 \times (2 + 3) = (3 \times \underline{\quad}) + (3 \times 3)$$

2. Use the multiplication-addition principle to solve the equations.

- A** Since $6 \times 58 = 348$, we know that $(6 \times 50) + (6 \times 8) = \underline{\hspace{2cm}}$
- B** Since $(4 \times 90) + (4 \times 6) = 384$, we know that $4 \times 96 = \underline{\hspace{2cm}}$
- C** Since $4 \times 20 = 80$ and $4 \times 3 = 12$, we know that $4 \times 23 = \underline{\hspace{2cm}}$
- D** Since $(5 \times 80) + (5 \times 7) = 435$, we know that $5 \times 87 = \underline{\hspace{2cm}}$

3. Solve the equations.

- | | |
|--|--|
| A $7 \times 6 = (4 \times 6) + (\underline{\hspace{1cm}} \times 6)$ | F $9 \times 11 = (\underline{\hspace{1cm}} \times 11) + (5 \times 11)$ |
| B $8 \times 5 = (4 \times 5) + (\underline{\hspace{1cm}} \times 5)$ | G $7 \times 25 = (3 \times 25) + (\underline{\hspace{1cm}} \times 25)$ |
| C $5 \times 15 = (5 \times \underline{\hspace{1cm}}) + (5 \times 5)$ | H $19 \times 9 = (10 \times 9) + (\underline{\hspace{1cm}} \times 9)$ |
| D $8 \times 13 = (8 \times 3) + (8 \times \underline{\hspace{1cm}})$ | I $53 \times 4 = (\underline{\hspace{1cm}} \times 4) + (3 \times 4)$ |
| E $17 \times 6 = (10 \times 6) + (\underline{\hspace{1cm}} \times 6)$ | J $109 \times 7 = (100 \times 7) + (\underline{\hspace{1cm}} \times 7)$ |

1. Solve the equations.

A $a + 9 = 18$

$a = \underline{\hspace{2cm}}$

C $4 \times c = 24$

$c = \underline{\hspace{2cm}}$

E $(3 \times 4) + e = 15$

$e = \underline{\hspace{2cm}}$

B $15 - b = 9$

$b = \underline{\hspace{2cm}}$

D $28 \div 7 = d$

$d = \underline{\hspace{2cm}}$

F $(2 \times f) - 1 = 13$

$f = \underline{\hspace{2cm}}$

2. Solve the equations. Think of the basic principles.

A $8 + 9 = \underline{\hspace{2cm}} + 8$

D $43 \times 3 = (\underline{\hspace{2cm}} \times 3) + (3 \times 3)$

B $753 + \underline{\hspace{2cm}} = 753$

E $\underline{\hspace{2cm}} \times 9 = 9$

C $67 \times 123 = 123 \times \underline{\hspace{2cm}}$

F $8 + (3 + 1) = (8 + \underline{\hspace{2cm}}) + 1$

3. Complete the function tables. In part D, give the function rule also.

A

Function rule	
$n \times 8$	
n	Output
4	32
6	
5	
7	

B

Function rule	
$n \div 6$	
n	Output
24	
36	
54	
48	

C

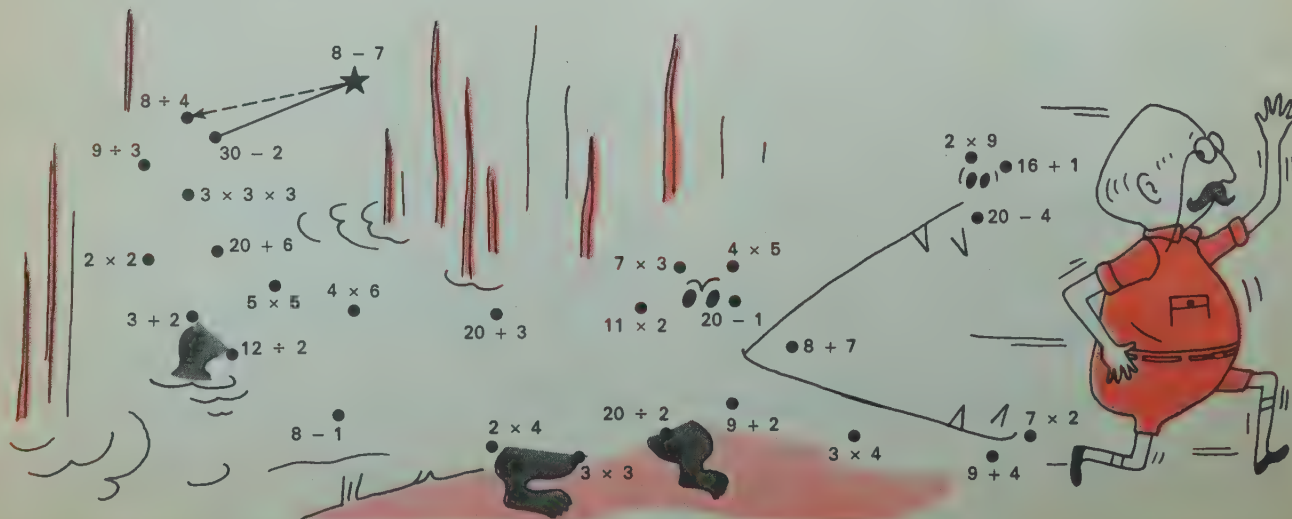
Function rule	
$n + 9$	
n	Output
7	
6	
	13
	12

D

Function rule	
n	Output
15	8
10	3
12	5
11	

CHANGE OF PACE

Solve each problem below. Then connect the dots in the numerical order. Begin at the star.

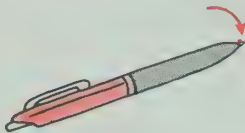


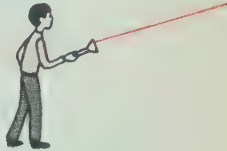

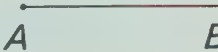
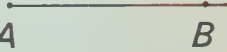


4

Geometry and Measurement I

● Points, Lines, Segments, and Rays

1. Study the chart. Then put a ring around the correct symbol in the "We write" row.

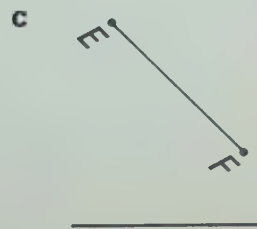
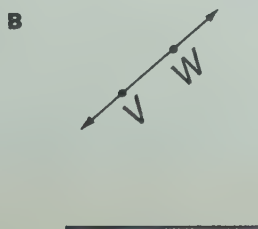
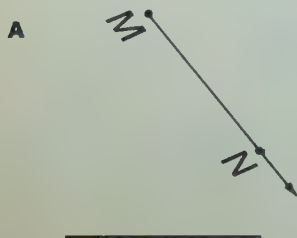
	Point	Line	Segment	Ray
We see				
We think	Point	Line	Segment	Ray
We draw	$P.$			
We write	\vec{P} \overline{P} \overrightarrow{P}	\overleftrightarrow{AB} \overline{AB} \overrightarrow{AB}	\overline{AB} \overleftrightarrow{AB} \overrightarrow{AB}	\overleftrightarrow{AB} \overrightarrow{AB} \overline{AB}

2. Draw a segment and label it \overline{PQ} .

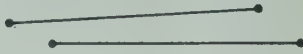
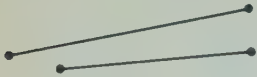
3. Draw a ray and label it \overrightarrow{RS} .

4. Draw a line and label it \overleftrightarrow{CD} .

5. Give the correct symbol for each figure.



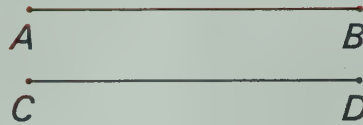
1. Below are three pair of segments. Ring the pair of segments whose ends are the same distance apart.



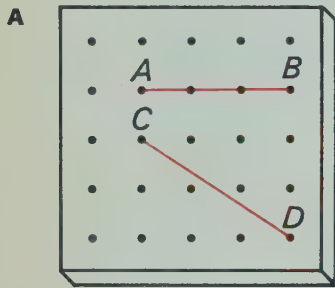
Two segments are **congruent** to each other if their ends are equally far apart.

In the figure, \overline{AB} is congruent to \overline{CD} .

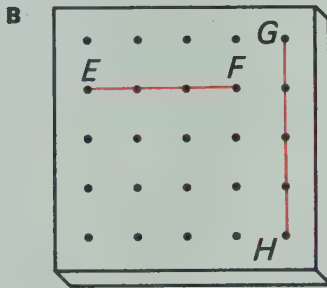
We write $\overline{AB} \cong \overline{CD}$.



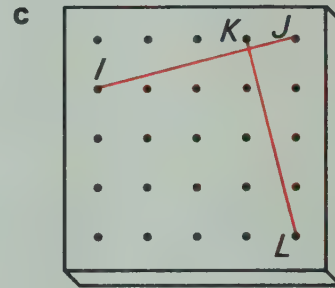
2. Two segments are shown on each geoboard. Ring the name of the longer segment. If the segments are congruent, place a " \cong " between the segment names.



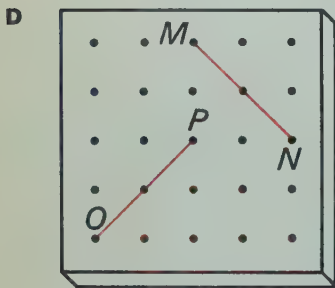
\overline{AB} \overline{CD}



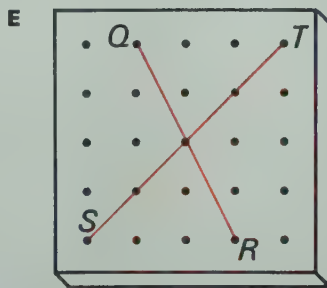
\overline{EF} \overline{GH}



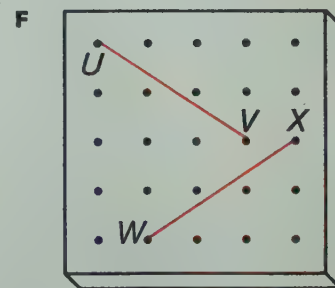
\overline{IJ} \overline{KL}



\overline{MN} \overline{OP}



\overline{QR} \overline{ST}



\overline{UV} \overline{WX}

3. For each part, answer T (true) or F (false).

A $\overline{EF} \cong \overline{GH}$ _____



B $\overline{GH} \cong \overline{JK}$ _____

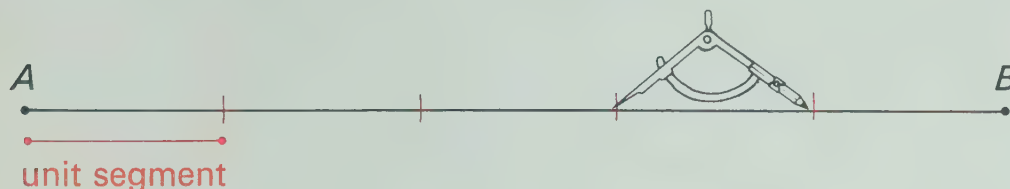


C $\overline{EF} \cong \overline{JK}$ _____



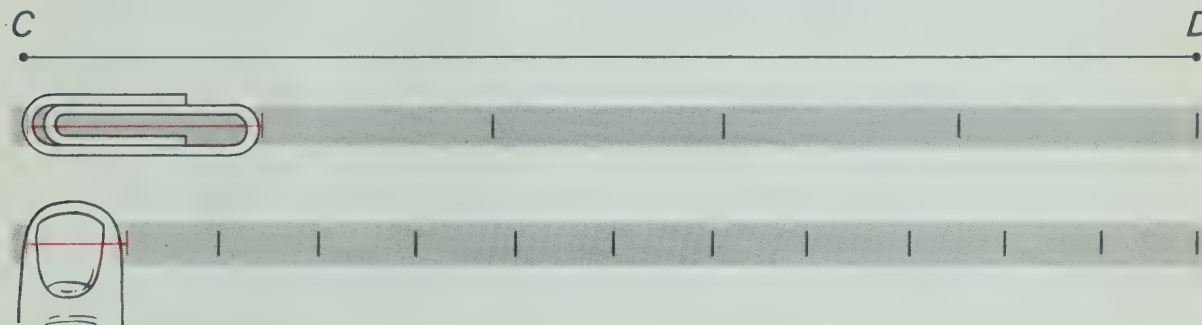
1. We can find the **length** of a segment by

- Ⓐ marking off segments congruent to a **unit segment** and then
- Ⓑ counting the number of segments we marked off.



- A The number of times the **unit segment** can be marked off along \overline{AB} is ____.
- B The length of \overline{AB} is ____ units.

2. The length of a segment depends upon the unit segment we use in measuring. We may use any unit length we choose to measure a segment.



- A Using the length of a paper clip as the unit, \overline{CD} is ____ units long.
- B Using the finger width as a unit, the length of \overline{CD} is ____ units.
- c The shorter the unit, the _____ (**greater, lesser**) the number for length.

3. Use a centimetre ruler to answer these questions.

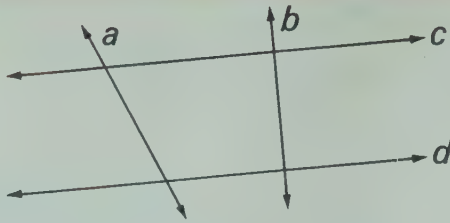


- A The length of \overline{EG} is ____ centimetres.
- B The length of \overline{EF} is about ____ centimetres.

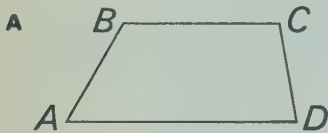
- 4. A Give your height in centimetres. ____
- B Give your height in metres. ____

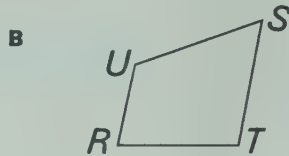
1. **Parallel lines** lie in the same plane and do not intersect.

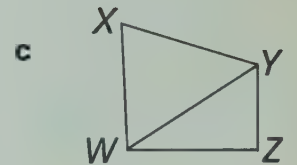
Which pair of lines in the figure at the right are parallel lines?



2. Name a pair of parallel line segments in each figure.

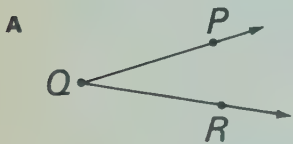
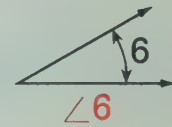


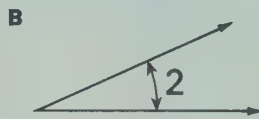


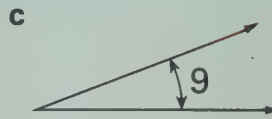


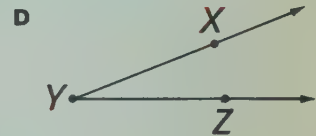
3. **An angle** is two rays from a single point.

Each of the two figures at the right shows an angle and its name. Give the name for each angle below.





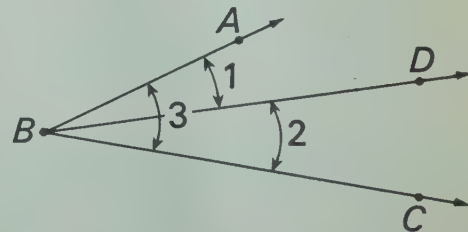




4. A Give a name for $\angle 1$ using 3 letters. _____

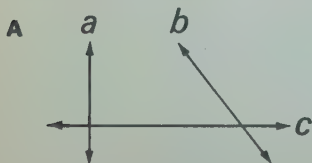
- B Give the number name for $\angle DBC$. _____

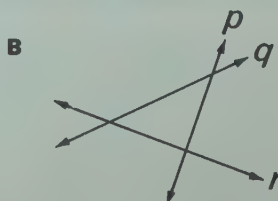
- C Give a name of $\angle 3$ using 3 letters. _____



5. Two lines are **perpendicular** if they intersect so that four angles of the same size are formed.

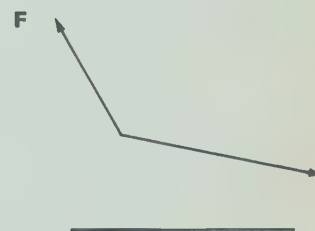
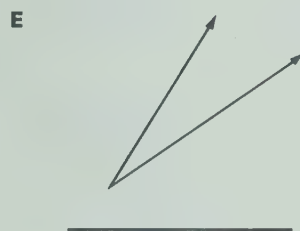
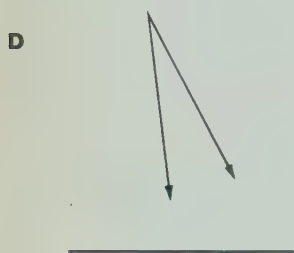
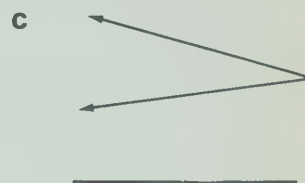
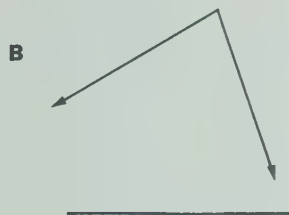
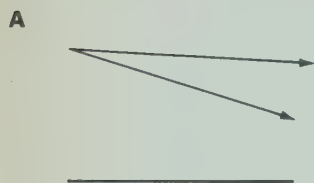
Name the pair of perpendicular lines in each figure.





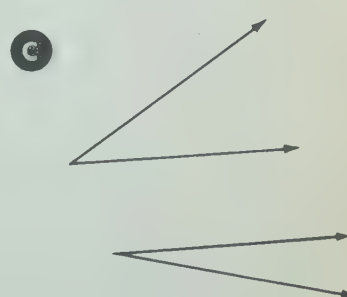
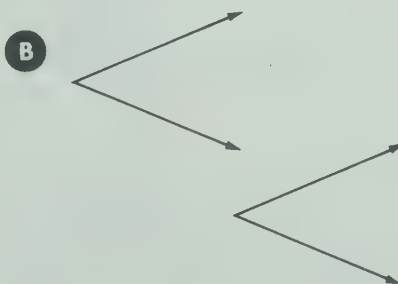
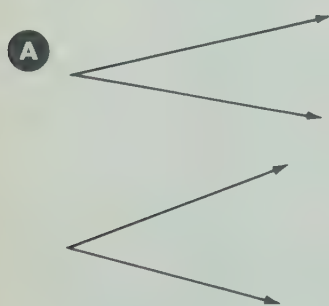


1. Trace $\angle A$ on a thin piece of paper. Place the tracing of $\angle A$ over each of the angles below. Write **larger**, **smaller**, or **congruent** to tell how each angle compares to $\angle A$.

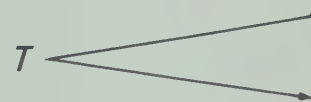
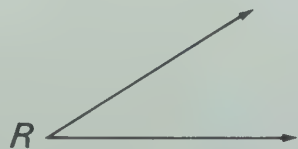
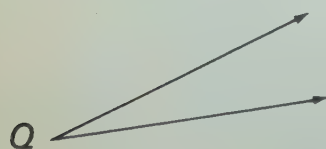


2. **A** Just by looking, tell which pair of angles are **not** congruent. _____

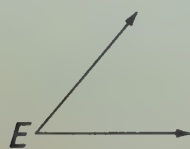
- B** In these pairs of angles, ring the larger angle.



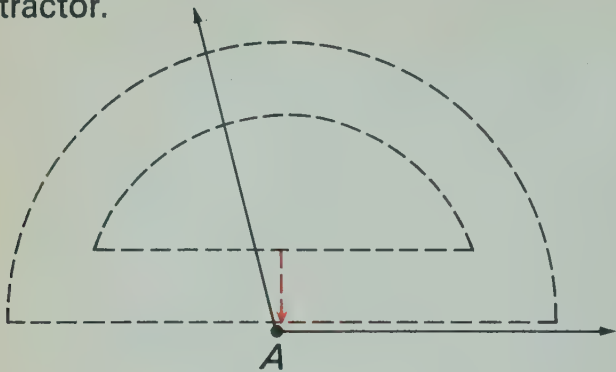
3. Which two angles are congruent to each other? _____



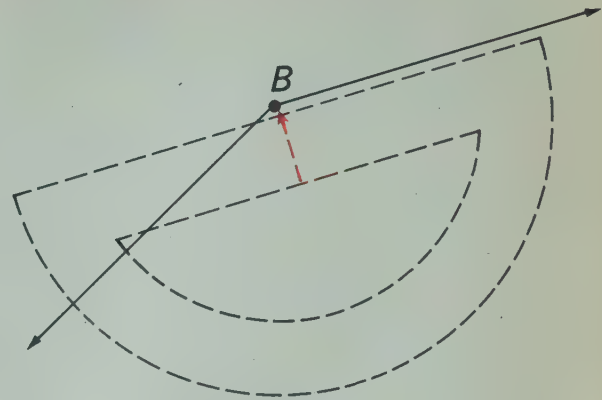
4. Draw a picture of angle that is smaller than $\angle E$. Then draw a picture of an angle that is larger than $\angle E$.



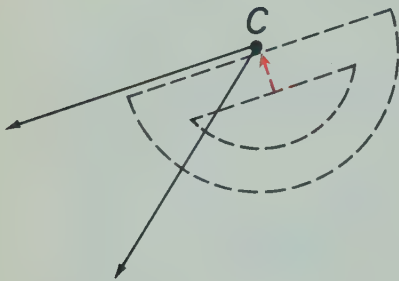
1. Use a degree protractor to measure each angle, then write the measure in the blank. The dotted lines in the first four exercises suggest how you should place your protractor.



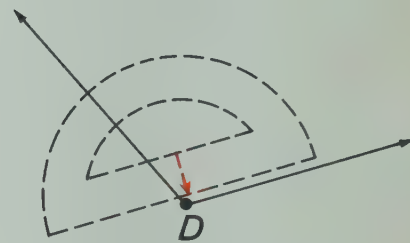
A Degree measure of $\angle A$ is _____



B Degree measure of $\angle B$ is _____



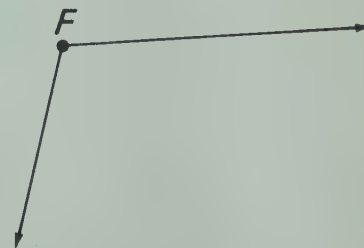
C Degree measure of $\angle C$ is _____



D Degree measure of $\angle D$ is _____



E Degree measure of $\angle E$ is _____



F Degree measure of $\angle F$ is _____

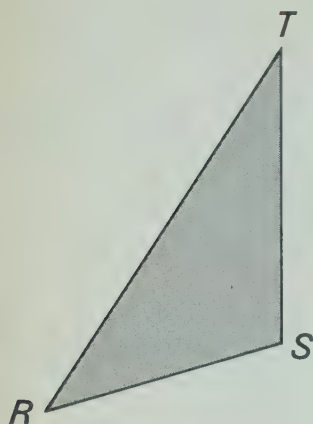
2. Use a degree protractor to draw angles of the size indicated below.

A 80 degrees

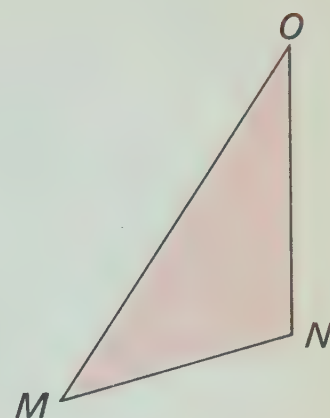
B 25 degrees

In each exercise, complete the table for the two congruent triangles.

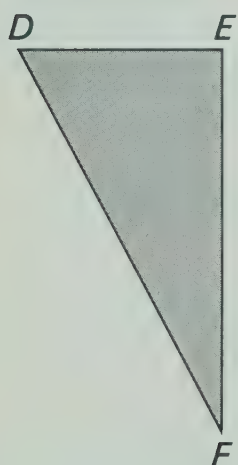
1.



\overline{RS}	\cong	_____
\overline{ST}	\cong	_____
\overline{TR}	\cong	_____
$\angle TRS$	\cong	_____
$\angle RST$	\cong	_____
$\angle STR$	\cong	_____



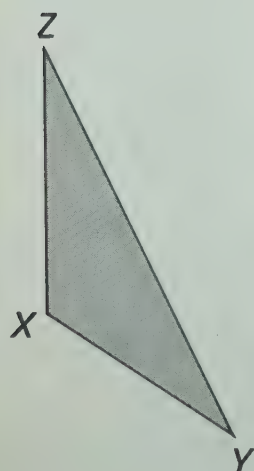
2.



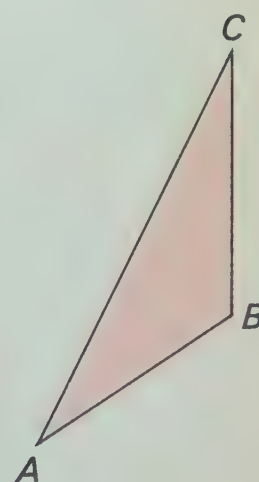
\overline{DF}	\cong	_____
\overline{FE}	\cong	_____
\overline{ED}	\cong	_____
$\angle DFE$	\cong	_____
$\angle FED$	\cong	_____
$\angle EDF$	\cong	_____



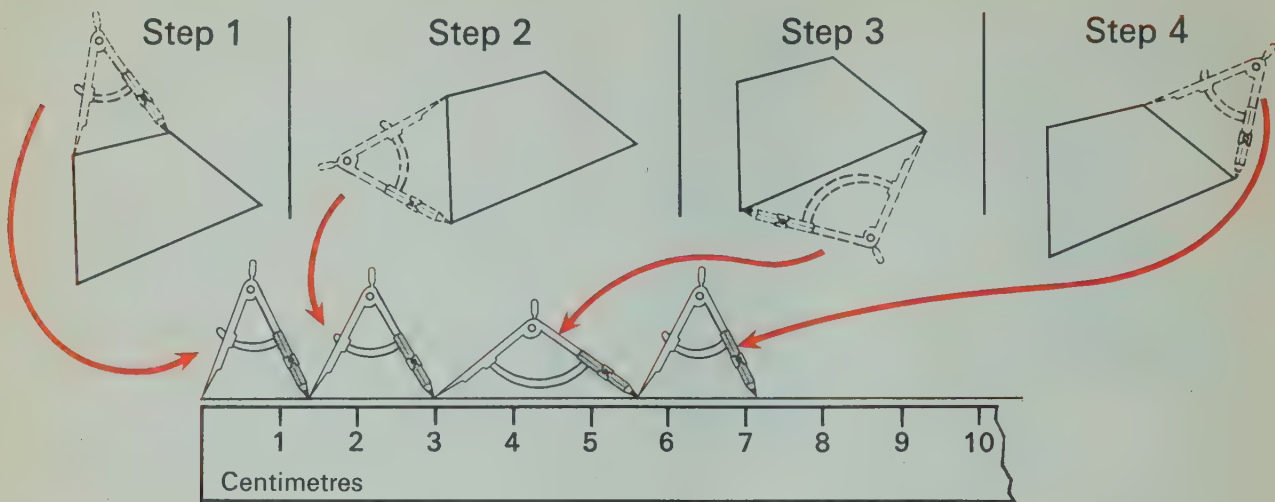
3.



\overline{XY}	\cong	_____
_____	\cong	\overline{BC}
\overline{ZY}	\cong	_____
$\angle ZXY$	\cong	_____
_____	\cong	$\angle CAB$
_____	\cong	$\angle BCA$



1. Study the method for finding the perimeter of a polygon. Then give the perimeter of the polygon shown.



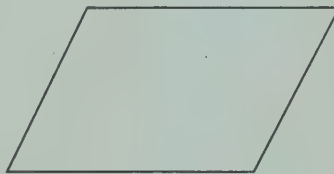
The perimeter of the polygon (to the **nearest** centimetre) is _____ centimetres.

2. Use the method shown above to find the perimeter of each polygon to the nearest centimetre. Use the lines at the bottom of this page and your centimetre ruler.

A _____ cm



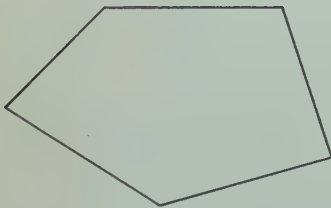
B _____ cm



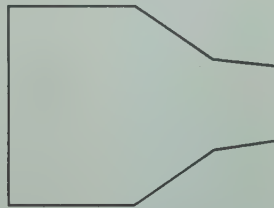
C _____ cm



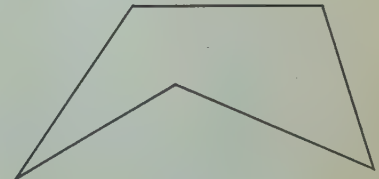
D _____ cm



E _____ cm



F _____ cm



A _____

B _____

C _____

D _____

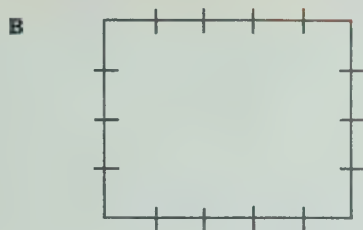
E _____

F _____

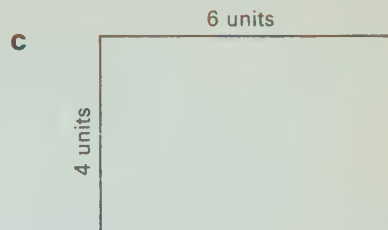
1. Give the area of each rectangular region.



_____ square units

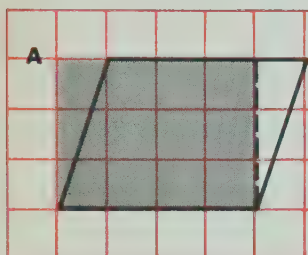


_____ square units

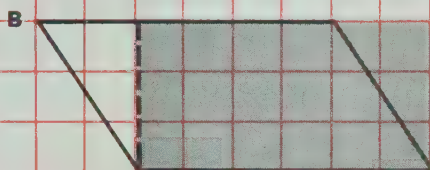


_____ square units

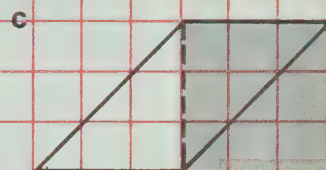
2. Find the area of each parallelogram. Use the gray rectangular region to help you.



_____ square units

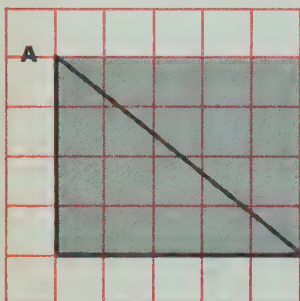


_____ square units

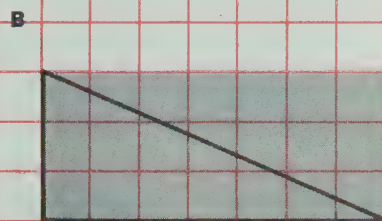


_____ square units

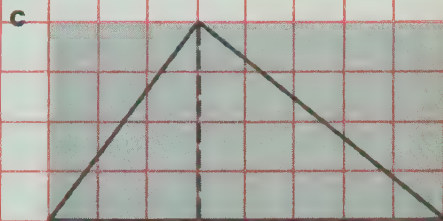
3. Find the area of each triangular region. It will help you to find the area of the gray rectangular region first.



_____ square units

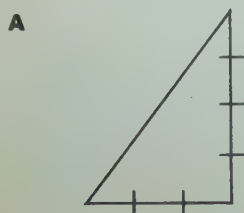


_____ square units

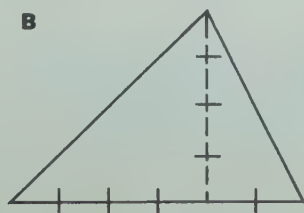


_____ square units

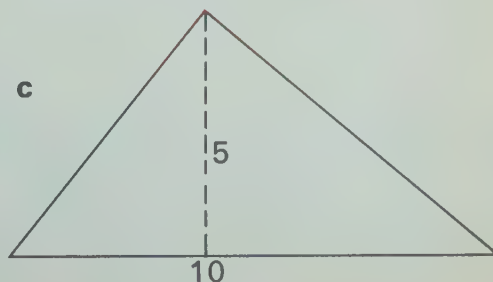
4. Find the area of each triangular region.



_____ square units



_____ square units



_____ square units

1. Draw and label a figure for each of the following.

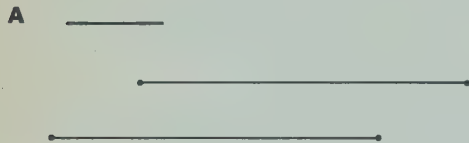
A \overline{RS}

B $\angle MNO$

C \overrightarrow{PQ}

D \overleftrightarrow{AB}

2. Use tracing to tell whether the pair of figures is congruent. Answer **yes** or **no**.



3. By placing your protractor in the position shown, find the measure of:

A $\angle ADC$ _____

B $\angle DAB$ _____

4. Give each length in centimetres.

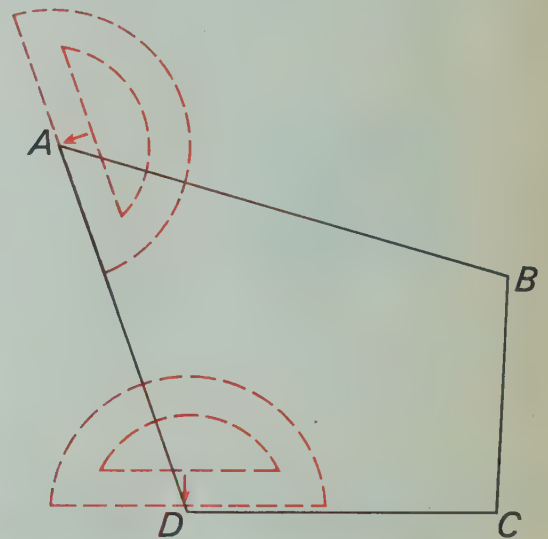
A \overline{AB} _____

B \overline{BC} _____

C \overline{CD} _____

D \overline{DA} _____

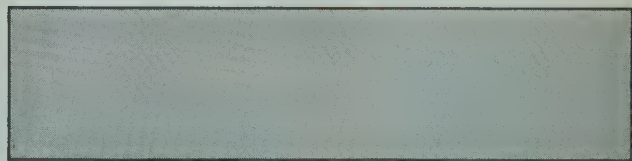
E Perimeter of polygon $ABCD$ is _____.



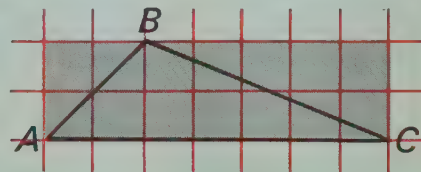
5. Give the perimeter and area of the rectangular region.

Perimeter: _____ cm

Area: _____ cm^2



6. The area of $\triangle ABC$ is _____ square units



CHANGE OF PACE

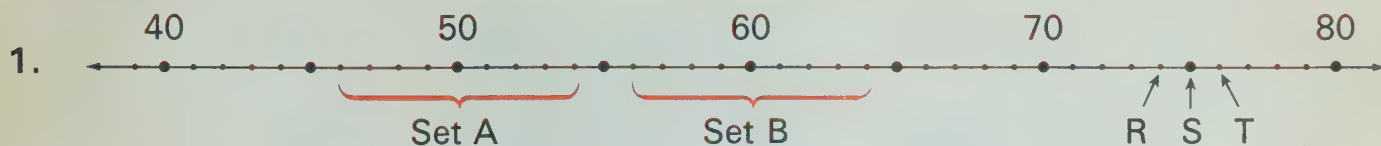
Mr. I. R. Trickey, who was a great puzzle maker, used 16 toothpicks to make 8 triangles as shown. He removed the 1 toothpick shown, and said "I can remove 3 more toothpicks and exactly 4 triangles will remain." Circle the toothpicks he could remove.



5

Estimation

● Multiples of 10 and 100 in Estimation



- A The whole numbers indicated by the points in set A are closer to 50 than they are to 40 or 60. List the whole numbers for set A. _____
- B The closest multiple of 10 for the numbers in set B is _____.
List the numbers for set B. _____
- C Give the whole number indicated for point R ____; point S ____; point T ____.
- D The closest multiple of 10 for point R is _____.
- E The closest multiple of 10 for point T is _____.
- F For numbers ending in 5, we usually call the next higher multiple of 10 the closest multiple of 10. Should we put 55 in set A or set B? _____
- G The "closest" multiple of 10 for point S is _____.



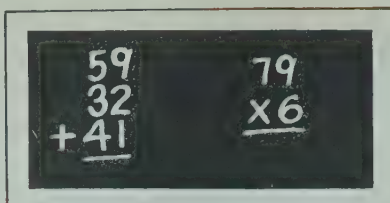
- A What is the closest multiple of 100 for the numbers in set C? _____
- B What is the closest multiple of 100 for the numbers in set D? _____
- C What is the closest multiple of 100 for the number indicated by U? _____
- D What is the closest multiple of 100 for the number indicated by W? _____
- E According to the agreement made in exercise 1, would you use 600 or 700 as the closest multiple of 100 for point V? _____

3. The number indicated by the colored numeral is closer to one of the multiples of 10 (or 100) than it is to the other. Ring the closer multiple of 10 or 100.

- | | | | |
|----------------------|----------------------|-------------------------|-------------------------|
| A 40, 42 , 50 | C 60, 65 , 70 | E 100, 123 , 200 | G 700, 750 , 800 |
| B 50, 57 , 60 | D 10, 18 , 20 | F 600, 689 , 700 | H 400, 449 , 500 |

1. Give an estimate for the sum and the product.

Think
 $60 + 30 + 40 = \underline{\hspace{2cm}}$



Think
 $80 \times 6 = \underline{\hspace{2cm}}$



2. Use multiples of 10 to fill the blanks.

- A To estimate $32 + 49$, we can find the sum $30 + \underline{\hspace{2cm}}$.
- B To estimate 6×83 , we can find the product $6 \times \underline{\hspace{2cm}}$.
- C To estimate $87 - 58$, we can find the difference $90 - \underline{\hspace{2cm}}$.
- D To estimate $81 \div 4$, we can find the quotient $\underline{\hspace{2cm}} \div 4$.

3. Give an estimate for each answer in exercise 2.

- A
- B
- C
- D

4. Use multiples of 100 to fill the blanks.

- A To estimate $296 + 811$, we can find the sum $300 + \underline{\hspace{2cm}}$.
- B To estimate 8×397 , we can find the product $8 \times \underline{\hspace{2cm}}$.
- C To estimate $685 - 510$, we can find the difference $\underline{\hspace{2cm}} - 500$.
- D To estimate $389 \div 8$, we can find the quotient $\underline{\hspace{2cm}} \div 8$.

5. Give an estimate for each answer in exercise 4.

- A
- B
- C
- D

6. Use multiples of 10 to estimate the answers.

- | | | |
|-------------------------------|-----------------------------------|------------------------------------|
| A $58 + 71$ <u> </u> | C 78×3 <u> </u> | E $32 + 61 + 89$ <u> </u> |
| B $67 - 29$ <u> </u> | D $88 \div 9$ <u> </u> | F $76 + 83 + 19$ <u> </u> |

7. Use multiples of 100 to estimate the answers.

- | | | |
|---------------------------------|----------------------------------|---------------------------------------|
| A $389 - 206$ <u> </u> | C $792 \div 8$ <u> </u> | E $620 + 796 + 888$ <u> </u> |
| B $578 + 612$ <u> </u> | D $698 + 489$ <u> </u> | F $502 + 890 + 99$ <u> </u> |

1. Find the products.

A $35 \times 10 = \underline{\hspace{2cm}}$

$(5 \times 7) \times 10 = \underline{\hspace{2cm}}$

$5 \times (7 \times 10) = \underline{\hspace{2cm}}$

$5 \times 70 = \underline{\hspace{2cm}}$

B $12 \times 100 = \underline{\hspace{2cm}}$

$(3 \times 4) \times 100 = \underline{\hspace{2cm}}$

$3 \times (4 \times 100) = \underline{\hspace{2cm}}$

$3 \times 400 = \underline{\hspace{2cm}}$

C $32 \times 1000 = \underline{\hspace{2cm}}$

$(4 \times 8) \times 1000 = \underline{\hspace{2cm}}$

$4 \times (8 \times 1000) = \underline{\hspace{2cm}}$

$4 \times 8000 = \underline{\hspace{2cm}}$

D $48 \times 1000 = \underline{\hspace{2cm}}$

$(8 \times 6) \times 1000 = \underline{\hspace{2cm}}$

$8 \times (6 \times 1000) = \underline{\hspace{2cm}}$

$8 \times 6000 = \underline{\hspace{2cm}}$

2. Find the products.

A $7 \times 50 = \underline{\hspace{2cm}}$

D $3 \times 40 = \underline{\hspace{2cm}}$

G $8 \times 900 = \underline{\hspace{2cm}}$

B $32 \times 10 = \underline{\hspace{2cm}}$

E $7 \times 100 = \underline{\hspace{2cm}}$

H $9 \times 1000 = \underline{\hspace{2cm}}$

C $6 \times 80 = \underline{\hspace{2cm}}$

F $6 \times 400 = \underline{\hspace{2cm}}$

I $5 \times 3000 = \underline{\hspace{2cm}}$

3. Find the products.

A $30 \times 70 = (3 \times 10) \times (7 \times 10) = (3 \times 7) \times (10 \times 10) = \underline{\hspace{2cm}}$

B $20 \times 400 = (2 \times 10) \times (4 \times 100) = (2 \times 4) \times (10 \times 100) = \underline{\hspace{2cm}}$

4. Find the products.

A $30 \times 40 = \underline{\hspace{2cm}}$

C $30 \times 70 = \underline{\hspace{2cm}}$

E $30 \times 600 = \underline{\hspace{2cm}}$

B $50 \times 70 = \underline{\hspace{2cm}}$

D $60 \times 50 = \underline{\hspace{2cm}}$

F $50 \times 300 = \underline{\hspace{2cm}}$

5. Find the quotients.

A Since $3 \times 400 = 1200$, we know that $1200 \div 3 = \underline{\hspace{2cm}}$.

B Since $30 \times 40 = 1200$, we know that $1200 \div 40 = \underline{\hspace{2cm}}$.

C Since $700 \times 5 = 3500$, we know that $3500 \div 5 = \underline{\hspace{2cm}}$.

6. Find the quotients.

A $1500 \div 3 = \underline{\hspace{2cm}}$

E $4000 \div 50 = \underline{\hspace{2cm}}$

I $2800 \div 7 = \underline{\hspace{2cm}}$

B $3500 \div 7 = \underline{\hspace{2cm}}$

F $4200 \div 60 = \underline{\hspace{2cm}}$

J $2100 \div 70 = \underline{\hspace{2cm}}$

C $4200 \div 6 = \underline{\hspace{2cm}}$

G $5400 \div 90 = \underline{\hspace{2cm}}$

K $3000 \div 5 = \underline{\hspace{2cm}}$

D $1200 \div 40 = \underline{\hspace{2cm}}$

H $6300 \div 70 = \underline{\hspace{2cm}}$

L $4500 \div 50 = \underline{\hspace{2cm}}$

Three estimates are given for each problem. Draw a ring around the estimate you think is best.

1. Sally bought 3 items at the department store. Their cost was \$1.98, \$5.19, and 88¢. Estimate how much Sally spent.
\$6.00 \$8.00 \$9.00



2. On a trip, Ann's father said that their average speed for 5 hours was 64 kilometres per hour. Estimate how far they had travelled during those 5 hours.
200 km 250 km 300 km

3. Jim estimated that there are about 1000 days in 3 years. Jim is 12 years old. Estimate Jim's age in days.
4000 days 8000 days 12 000 days



4. Suppose a major-league team buys baseballs for \$2.98 each. If they use 29 balls in a game, estimate the total cost of the balls for that one game.
\$40.00 \$60.00 \$90.00

FEBRUARY						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

5. Some months have 30 days, some have 31 days, and February has 28 or 29 days. Estimate the number of days in any 6-month period.
150 days 180 days 200 days

6. Jack paid for a football with a \$20 bill. Estimate how much change he should receive if the ball cost \$12.98.

\$7.00 \$8.00 \$9.00

7. The fifth-grade children just filled the first 8 rows in the school auditorium. There are 156 fifth-graders. Estimate the number of seats in each row.

10 seats 20 seats 30 seats



8. There are 64 brushfuls of paint in a litre and 2 litres in a can. Estimate the number of brushfuls in a can.

100 120 140

9. There are 24 hours in a day. Ring the best estimate.

- A 4 days: 50 hours
 100 hours 150 hours
B 12 days: 100 hours
 200 hours 300 hours



10. The gas tank on Mr. Albert's car holds about 72 litres. If he pays 16 cents a litre, estimate the cost of a full tank of gas.

\$4.00 \$8.00 \$12.00

11. If 3 cans of peaches sell for 98 cents, about what would it cost for a case of 24 cans of peaches?

\$8.00 \$12.00 \$24.00

1. Ring the closest multiple of 10 or 100 for each number indicated by a colored numeral.

A 70, 79 , 80	D 40, 41 , 50	G 50, 54 , 60	J 100, 138 , 200
B 30, 33 , 40	E 60, 66 , 70	H 30, 35 , 40	K 700, 771 , 800
C 20, 28 , 30	F 10, 19 , 20	I 20, 21 , 30	L 800, 826 , 900

2. Use multiples of 10 for parts **A** and **B** multiples of 100 for parts **C** and **D**.

A To estimate $49 + 32$, we can find the sum $50 + \underline{\hspace{2cm}}$.

B To estimate 8×38 , we can find the product $8 \times \underline{\hspace{2cm}}$.

C To estimate $891 - 508$, we can find the difference $900 - \underline{\hspace{2cm}}$.

D To estimate $294 \div 6$, we can find the quotient $\underline{\hspace{2cm}} \div 6$.

3. Give estimates for each of the following.

A $69 + 17$ <u> </u>	D $693 - 205$ <u> </u>	G 495×2 <u> </u>
B 4×99 <u> </u>	E 198×3 <u> </u>	H $591 - 199$ <u> </u>
C $792 \div 8$ <u> </u>	F $289 + 491$ <u> </u>	I $2395 \div 6$ <u> </u>

4. Suppose a man earns \$3.95 an hour. Estimate how much he would earn in an 8-hour day. Ring one: \$25 \$30 \$35

5. Mrs. Gray bought three items costing \$3.06, \$2.98, and \$9.88.

A Estimate her total bill. Ring one: \$10 \$16 \$19

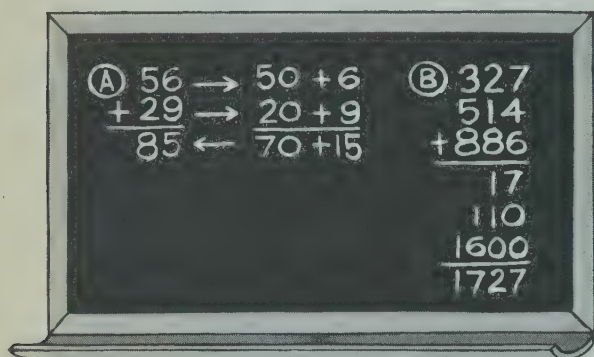
B Estimate her change from a \$20-bill. Ring one: \$4 \$8 \$1

CHANGE OF PACE

Study each sequence. Then give three more numbers for the sequence.

- | | |
|---|---|
| 1. 0, 2, 4, 6, 8, 10, <u> </u> | 6. 0, 1, 4, 9, 16, <u> </u> |
| 2. 1, 3, 5, 7, 9, <u> </u> | 7. 1, 2, 4, 8, <u> </u> |
| 3. 0, 5, 10, 15, 20, <u> </u> | 8. 1, 5, 2, 10, 3, 15, 4, <u> </u> |
| 4. 0, 7, 14, 21, 28, <u> </u> | 9. 1, 0, 3, 2, 5, 4, <u> </u> |
| 5. 1, 4, 7, 10, 13, <u> </u> | 10. 0, 1, 1, 2, 3, 5, 8, <u> </u> |

1. Study the examples shown on the chalkboard. Then give the missing digits for parts A and B.



A
$$\begin{array}{r} 68 \rightarrow 60 + \square \\ + 17 \rightarrow \square\square + 7 \\ \hline \square\square \leftarrow \square\square + 15 \end{array}$$

B
$$\begin{array}{r} 461 \\ + 395 \\ + 707 \\ \hline 1\square\square \\ 1\square\square 0 \\ 14\square\square \\ \hline \square\square\square\square \end{array}$$

2. Some digits are covered in these examples. Find these missing digits.

A
$$\begin{array}{r} 24 \\ + 59 \\ \hline 8\square \end{array}$$

B
$$\begin{array}{r} 847 \\ + 584 \\ \hline 14\square 1 \end{array}$$

C
$$\begin{array}{r} 627 \\ + 996 \\ \hline \square\square 23 \end{array}$$

D
$$\begin{array}{r} 47 \\ 18 \\ + 29 \\ \hline 9\square \end{array}$$

E
$$\begin{array}{r} 572 \\ 683 \\ + 195 \\ \hline 1\square 50 \end{array}$$

3. Find the sums.

A
$$\begin{array}{r} 17 \\ + 38 \\ \hline \end{array}$$

B
$$\begin{array}{r} 56 \\ + 95 \\ \hline \end{array}$$

C
$$\begin{array}{r} 657 \\ + 195 \\ \hline \end{array}$$

D
$$\begin{array}{r} 426 \\ + 985 \\ \hline \end{array}$$

E
$$\begin{array}{r} 647 \\ + 859 \\ \hline \end{array}$$

F
$$\begin{array}{r} 32 \\ 80 \\ + 51 \\ \hline \end{array}$$

G
$$\begin{array}{r} 39 \\ 12 \\ + 27 \\ \hline \end{array}$$

H
$$\begin{array}{r} 344 \\ 672 \\ + 841 \\ \hline \end{array}$$

I
$$\begin{array}{r} 326 \\ 847 \\ + 563 \\ \hline \end{array}$$

J
$$\begin{array}{r} 7643 \\ 8327 \\ + 5641 \\ \hline \end{array}$$

4. Each exercise has one incorrect digit. Put a ring around this incorrect digit. Write the correct digit in the colored space beside the exercise.

A
$$\begin{array}{r} 26 \\ + 58 \\ \hline 74 \end{array}$$

B
$$\begin{array}{r} 327 \\ + 146 \\ \hline 573 \end{array}$$

C
$$\begin{array}{r} 36 \\ 24 \\ + 19 \\ \hline 79 \end{array}$$

D
$$\begin{array}{r} 284 \\ 397 \\ + 651 \\ \hline 1232 \end{array}$$

1. Each exercise has one incorrect digit. Put a ring around the incorrect digit. Give the correct digit in the colored space beside the exercise.

$$\begin{array}{r} \overset{8}{9} \overset{14}{4} \\ - 68 \\ \hline 36 \end{array}$$

$$\begin{array}{r} \overset{3}{8} \overset{12}{4} \overset{12}{2} \\ - 126 \\ \hline 616 \end{array}$$

$$\begin{array}{r} \overset{3}{4} \overset{9}{0} \overset{12}{2} \\ - 138 \\ \hline 364 \end{array}$$

$$\begin{array}{r} \overset{1}{2} \overset{13}{4} \overset{11}{1} 7 \\ - 962 \\ \hline 2455 \end{array}$$

2. Find the sums and differences.

$$\begin{array}{r} \text{A} \quad 68 \\ - 42 \\ \hline \end{array}$$

$$\begin{array}{r} \text{B} \quad 95 \\ - 17 \\ \hline \end{array}$$

$$\begin{array}{r} \text{C} \quad 36 \\ + 18 \\ \hline \end{array}$$

$$\begin{array}{r} \text{D} \quad 127 \\ - 59 \\ \hline \end{array}$$

$$\begin{array}{r} \text{E} \quad 916 \\ - 431 \\ \hline \end{array}$$

$$\begin{array}{r} \text{F} \quad 62 \\ - 19 \\ \hline \end{array}$$

$$\begin{array}{r} \text{G} \quad 487 \\ + 156 \\ \hline \end{array}$$

$$\begin{array}{r} \text{H} \quad 341 \\ - 175 \\ \hline \end{array}$$

$$\begin{array}{r} \text{I} \quad 468 \\ - 278 \\ \hline \end{array}$$

$$\begin{array}{r} \text{J} \quad 304 \\ + 122 \\ \hline \end{array}$$

$$\begin{array}{r} \text{K} \quad 641 \\ + 278 \\ \hline \end{array}$$

$$\begin{array}{r} \text{L} \quad 803 \\ - 261 \\ \hline \end{array}$$

$$\begin{array}{r} \text{M} \quad 740 \\ - 324 \\ \hline \end{array}$$

$$\begin{array}{r} \text{N} \quad 528 \\ + 347 \\ \hline \end{array}$$

$$\begin{array}{r} \text{O} \quad 1270 \\ - 914 \\ \hline \end{array}$$

$$\begin{array}{r} \text{P} \quad 624 \\ + 986 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Q} \quad 903 \\ - 625 \\ \hline \end{array}$$

$$\begin{array}{r} \text{R} \quad 746 \\ - 191 \\ \hline \end{array}$$

$$\begin{array}{r} \text{S} \quad 600 \\ - 147 \\ \hline \end{array}$$

$$\begin{array}{r} \text{T} \quad 820 \\ + 356 \\ \hline \end{array}$$

$$\begin{array}{r} \text{U} \quad 7246 \\ + 1741 \\ \hline \end{array}$$

$$\begin{array}{r} \text{V} \quad 6241 \\ - 1328 \\ \hline \end{array}$$

$$\begin{array}{r} \text{W} \quad 5270 \\ + 8465 \\ \hline \end{array}$$

$$\begin{array}{r} \text{X} \quad 6041 \\ - 1770 \\ \hline \end{array}$$

$$\begin{array}{r} \text{Y} \quad 7000 \\ - 1264 \\ \hline \end{array}$$

3. Find the missing digits.

$$\begin{array}{r} \text{A} \quad 6 \quad \square \\ - 38 \\ \hline \quad 9 \end{array}$$

$$\begin{array}{r} \text{B} \quad 2 \quad \square \quad 7 \\ + 84 \\ \hline \quad 2 \end{array}$$

$$\begin{array}{r} \text{C} \quad \square \quad 2 \quad 1 \\ - 45 \quad \square \\ \hline 1 \quad \square \quad 5 \end{array}$$

$$\begin{array}{r} \text{D} \quad 3 \quad \square \quad \square \\ - 137 \\ \hline \quad \square \quad 6 \quad 3 \end{array}$$

$$\begin{array}{r} \text{E} \quad 4 \quad \square \quad 9 \quad \square \\ - 983 \\ \hline 3 \quad \square \quad 0 \quad 8 \end{array}$$

● Adding and Subtracting Amounts of Money

1. Complete the table.

Number of cents	Dollar notation	We read
295¢	\$2.95	2 dollars and 95 cents
349¢		_____ dollars and _____ cents
50¢	\$0.50	_____ cents
100¢		_____ dollar
	\$2.65	_____ dollars and _____ cents
3775¢		_____ dollars and _____ cents

2. First find the total number of cents. Then rewrite the entire exercise using dollar notation.

Example:
$$\begin{array}{r} 134\text{¢} \\ 241\text{¢} \\ \hline 375\text{¢} \end{array}$$
 $\$1.34$ $\$2.41$ $\$3.75$

A
$$\begin{array}{r} 295\text{¢} \\ 149\text{¢} \\ \hline \end{array}$$

B
$$\begin{array}{r} 588\text{¢} \\ 198\text{¢} \\ \hline \end{array}$$

3. Find the difference in the amounts. Then rewrite the exercise using dollar notation.

A
$$\begin{array}{r} 245\text{¢} \\ 120\text{¢} \\ \hline \end{array}$$

B
$$\begin{array}{r} 349\text{¢} \\ 198\text{¢} \\ \hline \end{array}$$

C
$$\begin{array}{r} 405\text{¢} \\ 188\text{¢} \\ \hline \end{array}$$

4. Find the total amounts.

A
$$\begin{array}{r} \$2.95 \\ 1.70 \\ \hline \end{array}$$
 B
$$\begin{array}{r} \$6.18 \\ 3.49 \\ \hline \end{array}$$
 C
$$\begin{array}{r} \$2.15 \\ 0.75 \\ \hline \end{array}$$
 D
$$\begin{array}{r} \$12.75 \\ 1.98 \\ \hline \end{array}$$
 E
$$\begin{array}{r} \$15.30 \\ 27.75 \\ \hline \end{array}$$

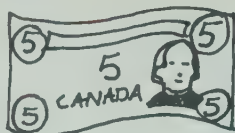
5. Find the difference in the amounts.

A
$$\begin{array}{r} \$6.98 \\ 4.25 \\ \hline \end{array}$$
 B
$$\begin{array}{r} \$3.49 \\ 1.50 \\ \hline \end{array}$$
 C
$$\begin{array}{r} \$8.56 \\ 2.49 \\ \hline \end{array}$$
 D
$$\begin{array}{r} \$5.95 \\ 1.98 \\ \hline \end{array}$$
 E
$$\begin{array}{r} \$37.88 \\ 1.49 \\ \hline \end{array}$$

6. Find the total amount. \$6.25 \$3.49 \$2.46 _____

7. Find the difference in the amounts. \$17.50 \$4.98 _____

1. Had \$5.00. Spent \$1.49. How much left? _____

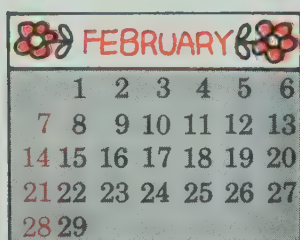


2. Drove 56 kilometres. Then drove 49 kilometres. How far in all? _____



3. 72-centimetre board. Saw off an 18-centimetre piece. How long is the other piece? _____

4. Leap year: February, 29 days; March, 31 days; April, 30 days. How many days in these three months? _____



5. Trip: first day, 437 km; second day, 395 km; third day, 512 km. How far in all? _____

6. Had \$10.00. Spent \$6.95 and \$2.50.

A Spent how much? _____

B Had how much left? _____

7. Auditorium: 900 seats. 338 boys, 376 girls, and 26 teachers seated.

A How many people seated? _____

B How many empty seats? _____

8. Started with \$5.00. Spent \$3.35.

A How much left? _____

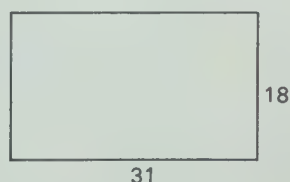
Then earned \$2.50.

B How much now? _____

Then found \$0.25 and spent \$0.49.

C How much now? _____

9. Find the distance around the rectangle. _____



10. Jet plane flying at 10 000 m. Propeller plane flying at 6000 m.

How much higher is the jet? _____

11. City block: 126 m. How many metres in 2 blocks? _____

12. Ball glove, \$6.75; bat, \$1.98; ball, \$2.49. How much in all? _____

1. Solve the equation shown on the blackboard.

$$4 \times 73 = (4 \times 70) + (4 \times \boxed{})$$

To find 4×73 , I think:
4 seventies and 4 threes.



2. Solve the equations.

A $5 \times 21 = (5 \times 20) + (5 \times \boxed{})$ C $3 \times 91 = (3 \times \boxed{}) + (3 \times 1)$

B $4 \times 36 = (4 \times \boxed{}) + (4 \times 6)$ D $4 \times 34 = (4 \times 30) + (4 \times \boxed{})$

3. Complete each equation. Give the missing numbers for each.

A $4 \times 8 = \underline{32}$ $4 \times 70 = \underline{}$ B $9 \times 6 = \underline{}$ $9 \times 40 = \underline{\phant{000}}$

$$\begin{array}{r} 78 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 78 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 46 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 46 \\ \times 9 \\ \hline \end{array}$$

C $7 \times 4 = \underline{28}$ $7 \times 60 = \underline{420}$ $7 \times 300 = \underline{2100}$

$$\begin{array}{r} 364 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 364 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 364 \\ \times 7 \\ \hline \end{array}$$

4. Find the products.

A $\begin{array}{r} 64 \\ \times 3 \\ \hline \end{array}$

B $\begin{array}{r} 312 \\ \times 6 \\ \hline \end{array}$

C $\begin{array}{r} 228 \\ \times 7 \\ \hline \end{array}$

D $\begin{array}{r} 1362 \\ \times 5 \\ \hline \end{array}$

E $\begin{array}{r} 3823 \\ \times 9 \\ \hline \end{array}$

1. Solve the equations.

- A Since $4 \times 39 = 156$, we know that $40 \times 39 = \underline{\hspace{2cm}}$.
- B Since $5 \times 48 = 240$, we know that $50 \times 48 = \underline{\hspace{2cm}}$.
- C Since $6 \times 72 = 432$, we know that $60 \times 72 = \underline{\hspace{2cm}}$.
- D Since $3 \times 564 = 1692$, we know that $30 \times 564 = \underline{\hspace{2cm}}$.

2. Find the products.

A	$\begin{array}{r} 76 \\ \times 40 \\ \hline \end{array}$	B	$\begin{array}{r} 83 \\ \times 50 \\ \hline \end{array}$	C	$\begin{array}{r} 27 \\ \times 90 \\ \hline \end{array}$	D	$\begin{array}{r} 54 \\ \times 30 \\ \hline \end{array}$	E	$\begin{array}{r} 64 \\ \times 70 \\ \hline \end{array}$	F	$\begin{array}{r} 325 \\ \times 70 \\ \hline \end{array}$
---	--	---	--	---	--	---	--	---	--	---	---

3. Find the first two products for each . Then give the sum for each .

A	$\begin{array}{r} 36 \\ \times 4 \\ \hline \end{array}$		$\begin{array}{r} 36 \\ \times 24 \\ \hline \end{array}$	B	$\begin{array}{r} 273 \\ \times 4 \\ \hline \end{array}$		$\begin{array}{r} 273 \\ \times 64 \\ \hline \end{array}$
	$\begin{array}{r} 36 \\ \times 20 \\ \hline \end{array}$		$\begin{array}{r} 36 \\ \times 20 \\ \hline \end{array}$		$\begin{array}{r} 273 \\ \times 60 \\ \hline \end{array}$		$\begin{array}{r} 273 \\ \times 60 \\ \hline \end{array}$

4. Find the products.

A	$\begin{array}{r} 46 \\ \times 4 \\ \hline \end{array}$	B	$\begin{array}{r} 27 \\ \times 5 \\ \hline \end{array}$	C	$\begin{array}{r} 265 \\ \times 6 \\ \hline \end{array}$	D	$\begin{array}{r} 307 \\ \times 8 \\ \hline \end{array}$	E	$\begin{array}{r} 63 \\ \times 12 \\ \hline \end{array}$	F	$\begin{array}{r} 47 \\ \times 23 \\ \hline \end{array}$
G	$\begin{array}{r} 68 \\ \times 34 \\ \hline \end{array}$	H	$\begin{array}{r} 36 \\ \times 47 \\ \hline \end{array}$	I	$\begin{array}{r} 42 \\ \times 84 \\ \hline \end{array}$	J	$\begin{array}{r} 563 \\ \times 76 \\ \hline \end{array}$	K	$\begin{array}{r} 184 \\ \times 32 \\ \hline \end{array}$	L	$\begin{array}{r} 276 \\ \times 361 \\ \hline \end{array}$

1. Fill each blank with the largest multiple of ten (10, 20, 30, 40, ...) that will make the sentence true.

A $\underline{\hspace{1cm}} \times 4 < 136$

D $\underline{\hspace{1cm}} \times 5 < 262$

G $\underline{\hspace{1cm}} \times 2 < 181$

B $\underline{\hspace{1cm}} \times 6 < 450$

E $\underline{\hspace{1cm}} \times 4 < 334$

H $\underline{\hspace{1cm}} \times 9 < 312$

C $\underline{\hspace{1cm}} \times 7 < 220$

F $\underline{\hspace{1cm}} \times 8 < 650$

I $\underline{\hspace{1cm}} \times 7 < 435$

2. Give the largest possible multiple of 10 for the colored ring. Give the largest 1-digit number for the black ring. Then write the quotient above the division box.

A

$$\begin{array}{r} 4 \overline{) 137} \\ \underline{120} \\ 17 \\ \underline{16} \\ 1 \end{array}$$

We can subtract fours.

We can subtract more fours.

1 ← remainder

B

$$\begin{array}{r} 6 \overline{) 450} \\ \underline{420} \\ 30 \\ \underline{30} \\ 0 \end{array}$$

 sixes

 sixes

0 ← remainder

C

$$\begin{array}{r} 7 \overline{) 220} \\ \underline{\hspace{1cm}} \\ \underline{\hspace{1cm}} \\ \underline{\hspace{1cm}} \end{array}$$

 sevens

 sevens

D

$$\begin{array}{r} 3 \overline{) 262} \\ \underline{\hspace{1cm}} \\ \underline{\hspace{1cm}} \\ \underline{\hspace{1cm}} \end{array}$$

 threes

 threes

3. Find the quotient and remainder for each exercise.

A $5 \overline{) 262}$

B $4 \overline{) 334}$

C $8 \overline{) 650}$

D $6 \overline{) 361}$

E $9 \overline{) 312}$

F $7 \overline{) 435}$

1. Write the largest possible multiple of 100 in the top ring, the largest multiple of 10 in the middle ring, and the largest 1-digit number in the bottom ring. Then give the quotient.

A

$$\begin{array}{r} 6 \overline{) 1459} \\ \underline{1200} \\ 259 \\ \underline{240} \\ 19 \\ \underline{18} \\ 1 \end{array}$$

← sixes
← sixes
← sixes

B

$$\begin{array}{r} 4 \overline{) 1264} \\ \underline{1200} \\ 64 \\ \underline{40} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

← fours
← fours
← fours

C

$$\begin{array}{r} 3 \overline{) 1718} \\ \underline{} \\ \\ \underline{} \\ \\ \underline{} \\ \end{array}$$

← threes
← threes
← threes

D

$$\begin{array}{r} 7 \overline{) 1860} \\ \underline{} \\ \\ \underline{} \\ \\ \underline{} \\ \end{array}$$

← sevens
← sevens
← sevens

2. Find the quotients and remainders.

A $2 \overline{) 1537}$

B $5 \overline{) 1935}$

C $6 \overline{) 1824}$

D $3 \overline{) 1062}$

E $4 \overline{) 2563}$

F $8 \overline{) 1856}$

1. In each exercise, fill each blank with the same number so that you get the given sum. Then complete the sentence.

A $3 + 8 + 7 + 2 = 20$

$\underline{5} + \underline{5} + \underline{\quad} + \underline{\quad} = 20$

We say that the **average** of

3, 8, 7, and 2 is 5

B $4 + 9 + 5 = 18$

$\underline{\quad} + \underline{\quad} + \underline{\quad} = 18$

We say that the **average** of

4, 9, and 5 is

C $9 + 12 + 8 + 12 = 40$

$\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} = 40$

We say that the **average** of

9, 12, 8, and 11 is .

D $10 + 13 + 13 = 36$

$\underline{\quad} + \underline{\quad} + \underline{\quad} = 36$

We say that the **average** of

10, 13, and 13 is .

E $2 + 4 + 5 + 1 + 3 = 15$

$\underline{\quad} + \underline{\quad} + \underline{\quad}$

$+ \underline{\quad} + \underline{\quad} = 15$

We say that the **average** of

2, 4, 5, 1, and 3 is .

F $12 + 17 + 16 = 45$

$\underline{\quad} + \underline{\quad} + \underline{\quad} = 45$

We say that the **average** of

12, 17, and 16 is .

2. A To find the average of 4, 6, and 5, we divide the sum of 4, 6, and by 3.

B To find the average of 2, 7, 6, and 5, we divide the sum of

2, 7, 6, and 5 by .

C To find the average of 3, 6, 4, 5, and 7, we divide the sum 25 by .

D To find the average of 8, 7, and 6, we divide by .

3. Find the average of each set of numbers.

A 33 and 59

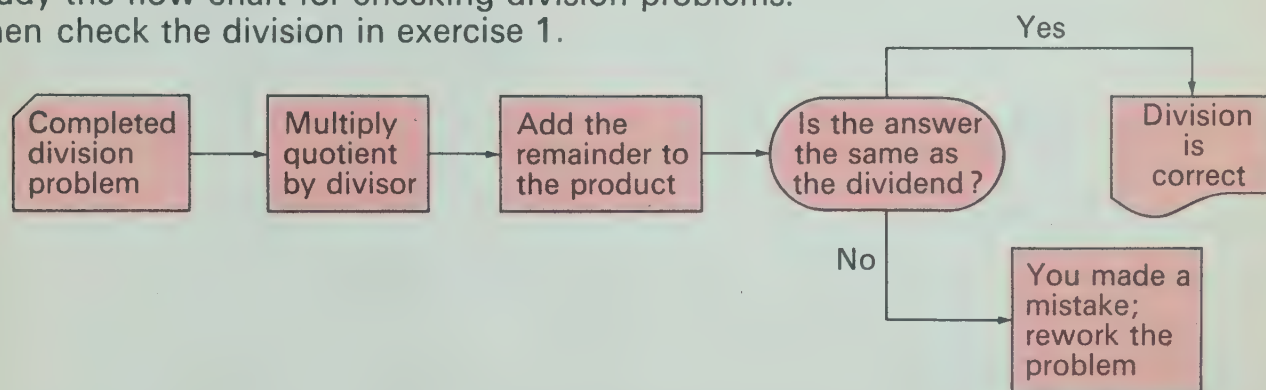
B 18, 27, 42, and 61

C 126, 133, and 154

1. Give the quotient and remainder for each step.

Step 1 Dividing hundreds	Step 2 Dividing tens	Step 3 Dividing ones
$27 \div 6$ Think: The quotient is <u>4</u> . The remainder is <u>3</u> . $\begin{array}{r} 4 \\ 6 \overline{) 27^3} 23 \end{array}$	$32 \div 6$ Think: The quotient is <u>5</u> . The remainder is _____. $\begin{array}{r} 45 \\ 6 \overline{) 27^3} 2^2 3 \end{array}$	$23 \div 6$ Think: The quotient is _____. The remainder is _____. $\begin{array}{r} 453r5 \\ 6 \overline{) 27^3} 2^2 3 \end{array}$

2. Study the flow chart for checking division problems. Then check the division in exercise 1.



3. Find the quotients and remainders. Check your work.

A $3 \overline{) 1723}$

B $4 \overline{) 2515}$

C $5 \overline{) 3625}$

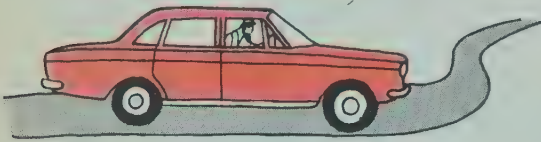
D $6 \overline{) 1541}$

E $2 \overline{) 1943}$

F $7 \overline{) 1524}$

1. 354 children in school.
6 grades. How many in
each grade? _____

2. Used 9 litres of gasoline
to drive 81 km.
How many kilometres per
litre? _____



3. Spent \$2.67 for 3 metres
of material. How much
for each metre? _____

4. Had 102 cm of ribbon.
Cut it into 6 pieces of
equal length. How long
is each piece? _____



5. Road signs: 8 km apart.
Highway: 1280 km long.

How many signs? _____

6. Race driver drove 678
km in 3 hours. How
many km in one hour?

7. Jan: 16 years old
Terry: 11 years old
Robert: 9 years old
Kim: 8 years old
What is the average
age? _____

8. 3 kilograms of hamburger
costs \$5.13. How much
for one kilogram? _____

9.

Name	Height
Max	159 cm
Carl	161 cm
Jack	159 cm
Bob	170 cm
Ray	166 cm

What is the average
height? _____

10. Spent \$1.33 for 7 litres
of gasoline. How much for
one litre? _____

11. 238 days. 7 days in one
week. How many weeks?

12. 368 litres. 8 litres in
one pail. How many
pails? _____

1. Find the largest multiple of 10 that will make the sentence true.

- | | | |
|---|---|---|
| A $\underline{\hspace{1cm}} \times 40 < 1380$ | E $\underline{\hspace{1cm}} \times 70 < 5421$ | I $\underline{\hspace{1cm}} \times 30 < 2314$ |
| B $\underline{\hspace{1cm}} \times 30 < 2615$ | F $\underline{\hspace{1cm}} \times 50 < 3621$ | J $\underline{\hspace{1cm}} \times 90 < 6511$ |
| C $\underline{\hspace{1cm}} \times 60 < 3270$ | G $\underline{\hspace{1cm}} \times 40 < 2807$ | K $\underline{\hspace{1cm}} \times 60 < 2834$ |
| D $\underline{\hspace{1cm}} \times 20 < 1125$ | H $\underline{\hspace{1cm}} \times 80 < 6511$ | L $\underline{\hspace{1cm}} \times 50 < 1760$ |

2. Give the correct multiple of 10 for the colored ring. Give the correct 1-digit number for the black ring. Then give the correct quotient.

A

$$\begin{array}{r}
 40 \overline{) 1380} \\
 \underline{1200} \quad \text{← } \text{forties} \\
 180 \\
 \underline{160} \quad \text{← } \text{forties} \\
 20
 \end{array}$$

B

$$\begin{array}{r}
 30 \overline{) 2615} \\
 \underline{2400} \quad \text{← } \text{thirties} \\
 215 \\
 \underline{210} \quad \text{← } \text{thirties} \\
 5
 \end{array}$$

3. Find the quotients and remainders.

A $20 \overline{) 327}$

B $20 \overline{) 1125}$

C $70 \overline{) 5421}$

D $50 \overline{) 3621}$

E $40 \overline{) 2807}$

F $80 \overline{) 6511}$

G $30 \overline{) 2154}$

H $60 \overline{) 2649}$

I $90 \overline{) 5812}$

1. Fill each blank with the largest whole number that will make the sentence true.

A $\underline{\hspace{1cm}} \times 41 < 250$

D $\underline{\hspace{1cm}} \times 38 < 281$

G $\underline{\hspace{1cm}} \times 83 < 334$

B $\underline{\hspace{1cm}} \times 29 < 127$

E $\underline{\hspace{1cm}} \times 61 < 435$

H $\underline{\hspace{1cm}} \times 39 < 286$

C $\underline{\hspace{1cm}} \times 32 < 201$

F $\underline{\hspace{1cm}} \times 27 < 200$

I $\underline{\hspace{1cm}} \times 72 < 375$

2. Fill the blank with the largest whole number that will make the sentence true. Use the estimate in the cloud to help you complete the dividing.

A $\frac{6}{\underline{\hspace{1cm}}} \times 30 < 193$

$$\begin{array}{r} 6 \\ 31 \overline{) 193} \\ \underline{186} \\ 7 \end{array}$$

B $\underline{\hspace{1cm}} \times 50 < 304$

$$\begin{array}{r} 6 \\ 48 \overline{) 304} \end{array}$$

C $\underline{\hspace{1cm}} \times 70 < 215$

$$\begin{array}{r} 3 \\ 65 \overline{) 215} \end{array}$$

3. Find the quotients and remainders.

A $28 \overline{) 182}$

B $42 \overline{) 128}$

C $31 \overline{) 155}$

D $49 \overline{) 255}$

E $21 \overline{) 168}$

F $57 \overline{) 362}$

G $62 \overline{) 295}$

H $27 \overline{) 196}$

4. Solve each short story problem.

A Drove 270 km.
Averaged 45 kilometres per hour.
How many hours? $\underline{\hspace{2cm}}$

B Took 3 hours to travel 195 km.
Averaged how many kilometres per hour?
 $\underline{\hspace{2cm}}$

1. Find the sums and differences.

A
$$\begin{array}{r} 683 \\ + 427 \\ \hline \end{array}$$

B
$$\begin{array}{r} 300 \\ - 228 \\ \hline \end{array}$$

C
$$\begin{array}{r} \$3.96 \\ + 4.29 \\ \hline \end{array}$$

D
$$\begin{array}{r} \$27.38 \\ - 18.59 \\ \hline \end{array}$$

E
$$\begin{array}{r} 3487 \\ 2600 \\ + 489 \\ \hline \end{array}$$

2. Find the products.

A
$$\begin{array}{r} 368 \\ \times 4 \\ \hline \end{array}$$

B
$$\begin{array}{r} 7365 \\ \times 6 \\ \hline \end{array}$$

C
$$\begin{array}{r} 48 \\ \times 30 \\ \hline \end{array}$$

D
$$\begin{array}{r} 685 \\ \times 21 \\ \hline \end{array}$$

E
$$\begin{array}{r} 408 \\ \times 62 \\ \hline \end{array}$$

3. The **average** of 12, 9, and 27 is _____.

4. Find the quotients and remainders.

A $8 \overline{)715}$

B $6 \overline{)4167}$

C $40 \overline{)1937}$

D $56 \overline{)250}$

CHANGE OF PACE

Work the puzzle.

Across

1. 4×64
3. $7200 + 30 + 1$
7. 8×9
8. 5×60
9. $100 + 10 + 1$
12. $27100 - 9$
14. 5 twelves
15. $(3 \times 8) + (3 \times 8)$
16. $97080 + 200$
18. 10 tens
19. $196 + 86 + 137$
22. 9 fives
24. 50×80
25. $1000 - 100$

Down

1. $270 \div 10$
2. $31624 + 20554$
4. 2 tens and 3
5. $90 \div 3$
6. 100×100
10. $700 \div 70$
11. $200 - 1$
12. $40072 - 15728$
13. 3×57
14. Sixty-eight thousand forty
17. $5 + 5 + 5 + 5$
20. $1000 \div 100$
21. $(2 \times 50) - (2 \times 5)$
23. $5 \times 5 \times 2$

1	2			3	4	5	6
7					8		
	9	10	11				
12				13		14	
15			16		17		
				18			
19	20	21				22	23
24					25		

1. Find the largest multiple of 10 that will make the sentence true.

A $\underline{\hspace{1cm}} \times 29 < 1264$

E $\underline{\hspace{1cm}} \times 32 < 3125$

I $\underline{\hspace{1cm}} \times 45 < 4161$

B $\underline{\hspace{1cm}} \times 41 < 3042$

F $\underline{\hspace{1cm}} \times 18 < 1215$

J $\underline{\hspace{1cm}} \times 62 < 2841$

C $\underline{\hspace{1cm}} \times 38 < 2461$

G $\underline{\hspace{1cm}} \times 43 < 3261$

K $\underline{\hspace{1cm}} \times 93 < 3154$

D $\underline{\hspace{1cm}} \times 57 < 3294$

H $\underline{\hspace{1cm}} \times 74 < 7142$

L $\underline{\hspace{1cm}} \times 36 < 1921$

2. Give the correct multiple of 10 for the colored ring. Give the correct 1-digit number for the black ring. Then give the correct quotient.

A

$$\begin{array}{r}
 \text{colored ring} \leftarrow \\
 29 \overline{) 1264} \\
 \underline{1160} \leftarrow \text{black ring} \text{ twenty-nines} \\
 104 \\
 \underline{87} \leftarrow \text{black ring} \text{ twenty-nines} \\
 17
 \end{array}$$

B

$$\begin{array}{r}
 \text{colored ring} \leftarrow \\
 41 \overline{) 3042} \\
 \underline{2780} \leftarrow \text{black ring} \text{ forty-ones} \\
 172 \\
 \underline{164} \leftarrow \text{black ring} \text{ forty-ones} \\
 8
 \end{array}$$

3. Find the quotients and remainders.

A $38 \overline{) 2461}$

B $57 \overline{) 3294}$

C $32 \overline{) 3125}$

D $18 \overline{) 1215}$

E $43 \overline{) 3261}$

F $74 \overline{) 7142}$

G $24 \overline{) 1056}$

H $57 \overline{) 3460}$

I $93 \overline{) 3099}$

1. Find the quotients and remainders.

A $28 \overline{) 241}$

B $28 \overline{) 176}$

C $53 \overline{) 339}$

D $53 \overline{) 212}$

2. Use exercises 1**A** and **B** to help you complete the two steps of this exercise.

Step 1
Dividing tens

$$\begin{array}{r} 8 \\ 28 \overline{) 2416} \\ \underline{224} \\ 17 \end{array}$$

Step 2
Dividing ones

$$\begin{array}{r} 8 \\ 28 \overline{) 2416} \\ \underline{224} \\ 176 \end{array}$$

3. Complete the two steps of this exercise. Exercises 1**C** and **D** will help you.

Dividing tens

$$53 \overline{) 3392}$$

Dividing ones

$$\begin{array}{r} 6 \\ 53 \overline{) 3392} \\ \underline{318} \\ 212 \end{array}$$

4. Find the quotients and remainders.

A $43 \overline{) 2764}$

B $69 \overline{) 3849}$

C $52 \overline{) 4605}$

1. Find the quotients and remainders.

A $42 \overline{) 145}$

B $42 \overline{) 193}$

C $42 \overline{) 257}$

2. Use exercise 1 to help you complete the three steps of this exercise.

Step 1
Dividing hundreds

$$42 \overline{) 14537}$$

Step 2
Dividing tens

$$\begin{array}{r} 3 \\ 42 \overline{) 14537} \\ \underline{126} \\ 193 \end{array}$$

Step 3
Dividing ones

$$\begin{array}{r} 34 \\ 42 \overline{) 14537} \\ \underline{126} \\ 193 \\ \underline{168} \\ 257 \end{array}$$

3. Find the quotients and remainders.

A $29 \overline{) 12346}$

B $51 \overline{) 34287}$

C $22 \overline{) 10653}$

D $43 \overline{) 27364}$

E $19 \overline{) 11026}$

F $48 \overline{) 32475}$

1. Find the products.

A $\begin{array}{r} \$3.85 \\ \times 7 \\ \hline \end{array}$

B $\begin{array}{r} \$0.95 \\ \times 4 \\ \hline \end{array}$

C $\begin{array}{r} \$6.22 \\ \times 5 \\ \hline \end{array}$

D $\begin{array}{r} \$0.68 \\ \times 12 \\ \hline \end{array}$

E $\begin{array}{r} \$1.38 \\ \times 25 \\ \hline \end{array}$

F $\begin{array}{r} \$6.85 \\ \times 13 \\ \hline \end{array}$

G $\begin{array}{r} \$5.75 \\ \times 99 \\ \hline \end{array}$

H $\begin{array}{r} \$42.78 \\ \times 6 \\ \hline \end{array}$

I $\begin{array}{r} \$10.00 \\ \times 78 \\ \hline \end{array}$

J $\begin{array}{r} \$50.90 \\ \times 43 \\ \hline \end{array}$

2. Find the quotients.

A $3 \overline{) \$6.84}$

B $40 \overline{) \$18.40}$

C $28 \overline{) \$43.68}$

D $41 \overline{) \$78.72}$

3. Solve each short story problem.

- A Bought 7 m of drapery fabric at \$3.95 per metre.

How much? _____

- C Bought one dozen packages of construction paper at 95¢ per package. How

much? _____

- B Spent \$141.44 for 4 car tires. What was the cost of one tire?

- D Sold \$45.50 worth of carnival tickets. If 26 tickets were sold, what was the price of

each ticket? _____

1. Find the quotients and remainders.

A $6 \overline{) 257}$

B $40 \overline{) 261}$

C $23 \overline{) 1764}$

D $38 \overline{) 24687}$

2. Find the products and quotients.

A $\$0.95$
 $\times 7$

B $\$1.28$
 $\times 5$

C $\$2.39$
 $\times 6$

D $\$0.73$
 $\times 19$

E $\$5.46$
 $\times 28$

F $8 \overline{) \$2.32}$

G $3 \overline{) \$2.16}$

H $12 \overline{) \$7.92}$

I $32 \overline{) \$15.04}$

3. Solve each short story problem.

A Drove 6 hours. Averaged 63 km/h. Travelled how far? _____

B Length of classroom is 900 cm. How many metres is this? _____

CHANGE OF PACE

The dark shaded region represents the forest, the region inside the colored rectangle represents the park, and the region in the black ring is the city. The letters represent points of interest. Give the point of interest that is:

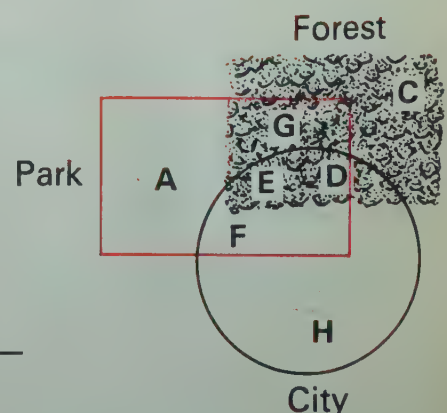
A in the park but not in the city or forest. _____

B in the city and the park but not in the forest. _____

C in the city and the park and the forest. _____

D in the forest and the park but not in the city. _____

E in the city but not in the forest or the park. _____



1. Solve each equation. Then list the factors of the given number.

A $1 \times \square = 12$

$2 \times \square = 12$

$3 \times \square = 12$

The factors of 12 are

1, 2, 3, 4, 6, 12.

B $1 \times \square = 15$

$3 \times \square = 15$

The factors of 15 are

_____.

C $1 \times \square = 18$

$2 \times \square = 18$

$3 \times \square = 18$

The factors of 18 are

_____.

2. Answer **yes** or **no**.

A Is 3 a factor of 18? _____

B Is 4 a factor of 16? _____

C Is 3 a factor of 16? _____

D Is 4 a factor of 18? _____

E Is 2 a factor of 25? _____

F Is 5 a factor of 25? _____

G Is 6 a factor of 24? _____

H Is 7 a factor of 24? _____

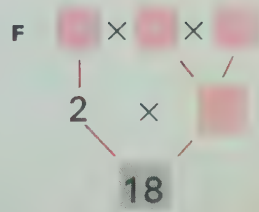
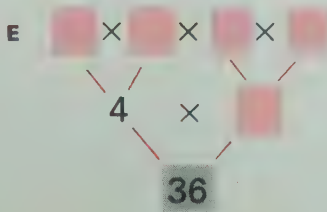
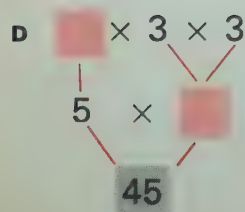
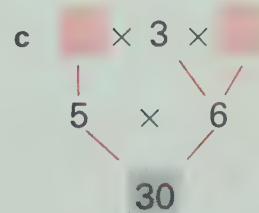
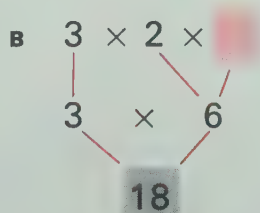
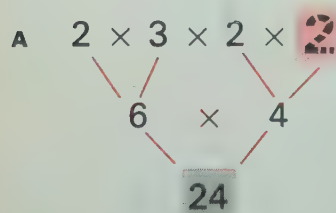
I Is 8 a factor of 24? _____

J Is 1 a factor of 13? _____

K Is 13 a factor of 13? _____

L Is 7 a factor of 56? _____

3. Give the missing numbers for each factor tree.



Prime numbers

are greater than 1.

have just two factors.

1. A 5 is greater than 1.
The factors of 5 are 5 and 1.
Is 5 a prime number? _____
- B 13 is greater than 1.
The factors of 13 are _____ and _____.
Is 13 a prime number? _____

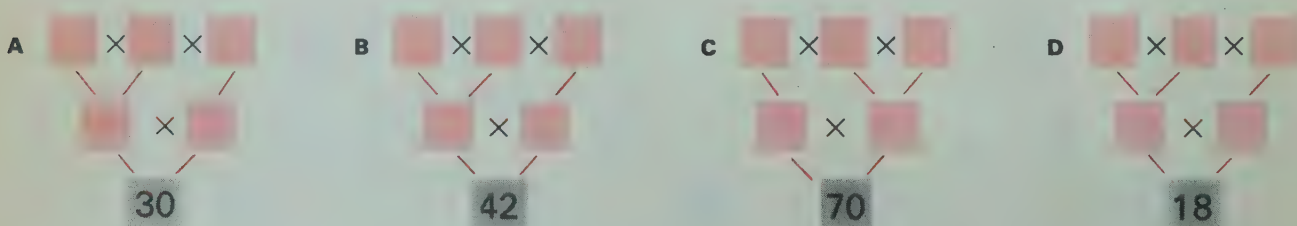
2. The number 6 is not prime because it has more than _____ factors.

3. Why is 21 not a prime number? _____

4. Put a ring around each prime number.

0	1	(2)	(3)	4	(5)	6	(7)	8	9	10	(11)	12
13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51

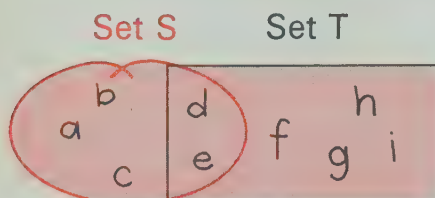
5. When you complete a factor tree, the top row should have prime numbers only.
Complete these factor trees.



6. Fill the blanks, using prime numbers only.
Exercise 5 should help you.

- A $30 = \underline{\quad} \times \underline{\quad} \times \underline{\quad}$
- B $42 = \underline{\quad} \times \underline{\quad} \times \underline{\quad}$
- C $70 = \underline{\quad} \times \underline{\quad} \times \underline{\quad}$
- D $18 = \underline{\quad} \times \underline{\quad} \times \underline{\quad}$

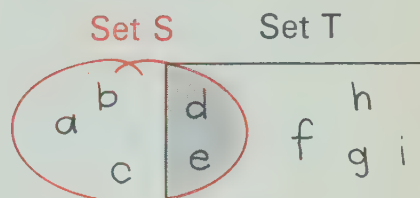
1. The union (\cup) of two sets contains all the objects that are in one set or the other or in both sets.



Give the rest of the letters for the union of the two sets.

$$S \cup T = \{a, b, c, d, e, f, \underline{\hspace{2cm}}\}$$

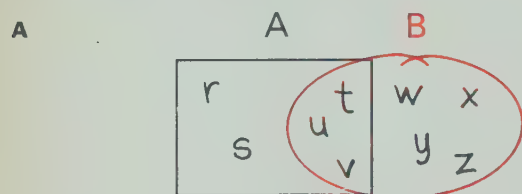
2. The intersection (\cap) of two sets contains just the objects that are in both sets.



Give the rest of the letters for the intersection of the two sets.

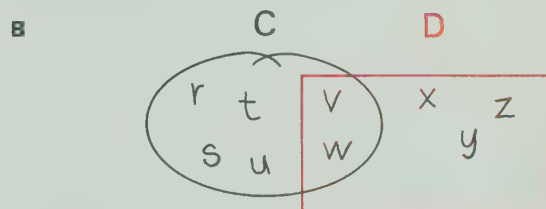
$$S \cap T = \{d, \underline{\hspace{2cm}}\}$$

3. For each exercise, give the union and intersection of the two sets.



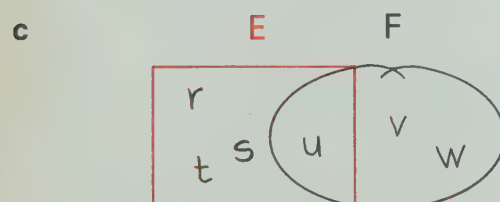
$$A \cup B = \{\underline{\hspace{2cm}}\}$$

$$A \cap B = \{\underline{\hspace{2cm}}\}$$



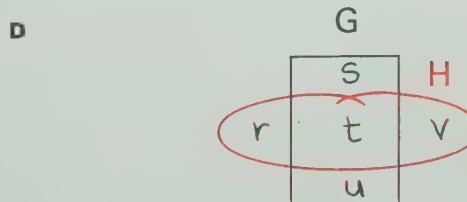
$$C \cup D = \{\underline{\hspace{2cm}}\}$$

$$C \cap D = \{\underline{\hspace{2cm}}\}$$



$$E \cup F = \{\underline{\hspace{2cm}}\}$$

$$E \cap F = \{\underline{\hspace{2cm}}\}$$



$$G \cup H = \{\underline{\hspace{2cm}}\}$$

$$G \cap H = \{\underline{\hspace{2cm}}\}$$

4. Give the union and intersection for each exercise.

A $I = \{0, 1, 2, 3\}$
 $J = \{2, 3, 4\}$

B $K = \{7, 8, 9\}$
 $L = \{3, 4, 5, 6, 7\}$

C $P = \{6, 7, 8, 9\}$
 $Q = \{3, 4, 5\}$

$$I \cup J = \underline{\{0, 1, 2, 3, 4\}}$$

$$K \cup L = \{\underline{\hspace{2cm}}\}$$

$$P \cup Q = \{\underline{\hspace{2cm}}\}$$

$$I \cap J = \underline{\{2, 3\}}$$

$$K \cap L = \{\underline{\hspace{2cm}}\}$$

$$P \cap Q = \{\underline{\hspace{2cm}}\}$$

1. Give the missing numbers.

- A The factors of 12 \longrightarrow $S = \{1, 2, 3, 4, 6, 12\}$
 The factors of 18 \longrightarrow $T = \{1, 2, 3, 6, 9, 18\}$
 The common factors
 of 12 and 18 \longrightarrow $S \cap T = \{1, 2, \underline{\hspace{2cm}}\}$

The greatest common factor of 12 and 18 is $\underline{\hspace{2cm}}$.

- B The factors of 9 \longrightarrow $S = \{1, 3, 9\}$
 The factors of 12 \longrightarrow $T = \{\underline{\hspace{2cm}}\}$
 The common factors
 of 9 and 12 \longrightarrow $S \cap T = \{\underline{\hspace{2cm}}\}$

The greatest common factor of 9 and 12 is $\underline{\hspace{2cm}}$.

- C The factors of 12 \longrightarrow $S = \{\underline{\hspace{2cm}}\}$
 The factors of 20 \longrightarrow $T = \{1, 2, 4, \underline{\hspace{2cm}}\}$
 The common factors
 of 12 and 20 \longrightarrow $S \cap T = \{\underline{\hspace{2cm}}\}$

The greatest common factor of 12 and 20 is $\underline{\hspace{2cm}}$.

- D The factors of 18 \longrightarrow $S = \{\underline{\hspace{2cm}}\}$
 The factors of 24 \longrightarrow $T = \{\underline{\hspace{2cm}}\}$
 The common factors
 of 18 and 24 \longrightarrow $S \cap T = \{\underline{\hspace{2cm}}\}$

The greatest common factor of 18 and 24 is $\underline{\hspace{2cm}}$.

- E The factors of 20 \longrightarrow $S = \{\underline{\hspace{2cm}}\}$
 The factors of 30 \longrightarrow $T = \{\underline{\hspace{2cm}}\}$
 The common factors
 of 20 and 30 \longrightarrow $S \cap T = \{\underline{\hspace{2cm}}\}$

The greatest common factor of 20 and 30 is $\underline{\hspace{2cm}}$.

2. Give the greatest common factor for each pair of numbers.

- A 6 and 9 $\underline{\hspace{2cm}}$ B 9 and 21 $\underline{\hspace{2cm}}$ C 12 and 16 $\underline{\hspace{2cm}}$ D 15 and 20 $\underline{\hspace{2cm}}$

The **least common multiple** of two numbers is the smallest common multiple, other than zero, of the two numbers.

1. Give the missing numbers.

- A** Multiples of 2 \longrightarrow $S = \{0, 2, 4, 6, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \dots\}$
 Multiples of 5 \longrightarrow $T = \{0, 5, 10, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \dots\}$
 Common multiples
 of 2 and 5 \longrightarrow $S \cap T = \{0, \underline{\hspace{1cm}}, \dots\}$

The least common multiple of 2 and 5 is _____.

- B** Multiples of 6 \longrightarrow $S = \{0, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \dots\}$
- Multiples of 9 \longrightarrow $T = \{0, 9, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \dots\}$
- Common multiples
of 6 and 9 \longrightarrow $S \cap T = \{\underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \dots\}$

The least common multiple of 6 and 9 is _____.

- c Multiples of 4 \longrightarrow $S = \{ \underline{\hspace{2cm}} \}$
 Multiples of 6 \longrightarrow $T = \{ \underline{\hspace{2cm}} \}$
 Common multiples
 of 4 and 6 \longrightarrow $S \cap T = \{ \underline{\hspace{2cm}} \}$

The least common multiple of 4 and 6 is _____.

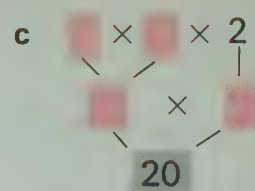
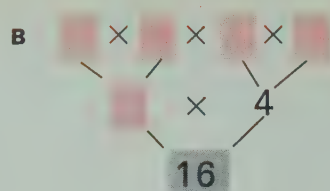
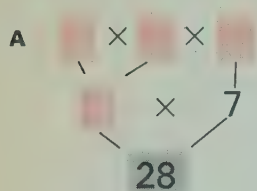
- D** Multiples of 4 \longrightarrow $S = \{ \underline{\hspace{2cm}} \}$
- Multiples of 5 \longrightarrow $T = \{ \underline{\hspace{2cm}} \}$
- Common multiples
of 4 and 5 \longrightarrow $S \cap T = \{ \underline{\hspace{2cm}} \}$

The least common multiple of 4 and 5 is _____.

2. Give the least common multiple for each pair of numbers.

- A** 3 and 6 _____
- B** 5 and 6 _____
- C** 6 and 10 _____
- D** 8 and 10 _____
- E** 2 and 9 _____
- F** 4 and 12 _____

1. Complete each factor tree.



2. List all the factors of each number.

A 9: _____

B 12: _____

C 20: _____

3. Put a ring around each prime number.

5 9 17 27 31 41 51 59 63

4. Give the union and intersection of the sets.

A $S = \{0, 1, 2, 3, 4\}$

$T = \{2, 3, 4, 5, 6, 7, 8\}$

$S \cup T = \{ \text{_____} \}$

$S \cap T = \{ \text{_____} \}$

B $S = \{3, 4, 5, 6, 7, 8, 9\}$

$T = \{5, 6\}$

$S \cup T = \{ \text{_____} \}$

$S \cap T = \{ \text{_____} \}$

5. Give the greatest common factor of 16 and 20. _____

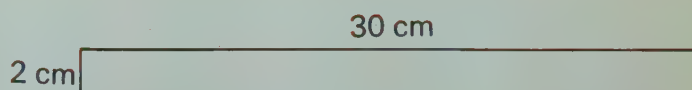
6. Give the least common multiple of 2 and 3. _____

CHANGE OF PACE

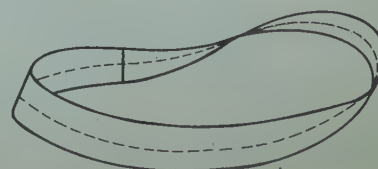
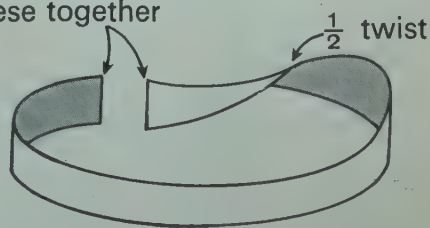
Cut out a strip of paper about 30 cm long and about 2 cm wide. Use this strip of paper to make a band with a half twist in it.

What you now have is called a **Möbius strip**.

Now cut the strip as indicated by the dotted line in the figure. What do you think you will get? Try it and find out. You may be surprised.

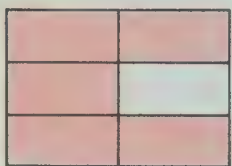
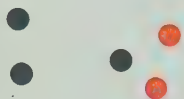

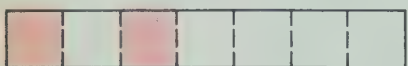

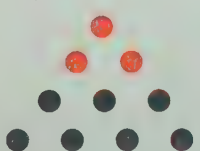
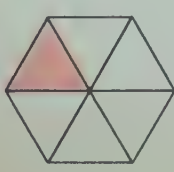


Tape these together



In each row of the table, write the correct whole number in each .

Then write the correct fraction in each .

Region or set	Number pair	Fraction
1. 	<input type="text"/> colored parts. <input type="text"/> parts in all.	<input type="text"/> of the region is colored.
2. 	<input type="text"/> red dots. <input type="text"/> dots in all.	<input type="text"/> of the dots are red.
3. 	<input type="text"/> colored parts. <input type="text"/> parts in all.	<input type="text"/> of the region is colored.
4. 	<input type="text"/> colored parts. <input type="text"/> parts in all.	<input type="text"/> of the region is colored.
5. 	<input type="text"/> colored parts. <input type="text"/> parts in all.	<input type="text"/> of the region is colored.
6. 	<input type="text"/> red dots. <input type="text"/> dots in all.	<input type="text"/> of the dots are red.
7. 	<input type="text"/> colored parts. <input type="text"/> parts in all.	<input type="text"/> of the region is colored.

1. Shade $\frac{3}{4}$ of this region.



2. Shade $\frac{7}{12}$ of these figures.



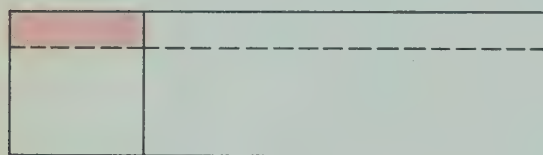
3. Shade $\frac{3}{8}$ of these figures.



4. Shade $\frac{1}{3}$ of this region.



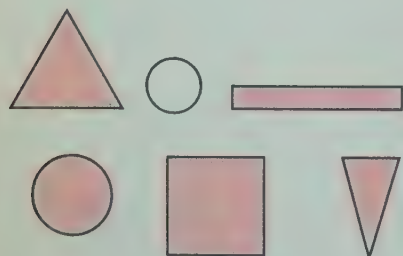
5. Would you say that $\frac{1}{4}$ of this rectangular region is colored? _____ (yes or no)



6. Shade $\frac{1}{4}$ of this region.



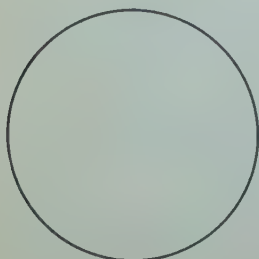
7. Would you say that $\frac{5}{6}$ of these figures are colored? _____ (yes or no)



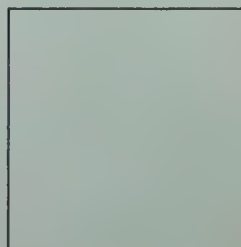
8. Shade $\frac{3}{4}$ of these figures.



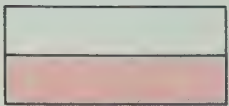



















9. Shade $\frac{1}{4}$ of this region.







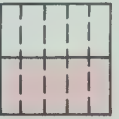









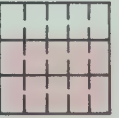
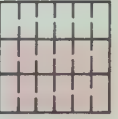







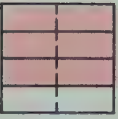
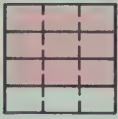
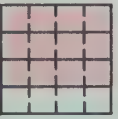
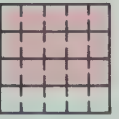
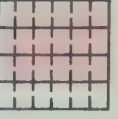






10. Shade $\frac{3}{4}$ of this region.




1. In each row of the table, write the fractions suggested by the division marks and the shaded portion of the region.



A		→		is equivalent to		←	
B		→		is equivalent to		←	
C		→		is equivalent to		←	
D		→		is equivalent to		←	
E		→		is equivalent to		←	



2. In each row, the fractions suggested by the shaded part of each region are equivalent to each other. Write these fractions.

A						
	$\frac{1}{2}$	$\frac{2}{4}$				
B						
						
C						
						

Give the fraction for each strip.

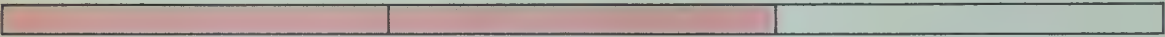
1.  $\frac{1}{4}$

A  



B  

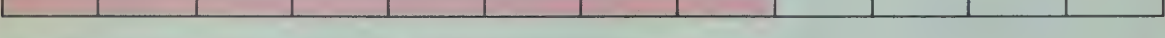

C  

D  

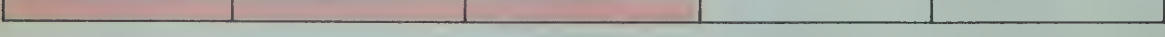
2.  $\frac{2}{3}$


A  

B  

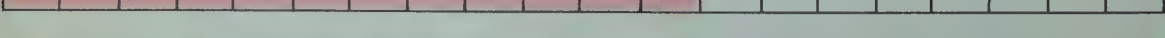

C  

D  

3.  $\frac{3}{5}$

A  

B  

C  

D  

$$1. \frac{1 \times 3}{1 \times 5},$$

3/5

$$\frac{2 \times 3}{2 \times 5},$$

$$\frac{6}{10}$$

$$\frac{3 \times 3}{3 \times 5},$$

$$\frac{4 \times 3}{4 \times 5},$$

$$2. \frac{1 \times 7}{1 \times 8},$$

$$\frac{7}{8}$$

$$\frac{2 \times 7}{2 \times 8},$$

$$\frac{14}{16}$$

$$\frac{3 \times 7}{3 \times 8},$$

$$\frac{4 \times 7}{4 \times 8}$$

3. $\frac{1 \times 1}{1 \times 6}$,

$$\frac{2 \times 1}{2 \times 6},$$

$$\frac{3 \times 1}{3 \times 6},$$

$$\frac{4 \times 1}{4 \times 6}$$

4. $\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \dots$

5. $\frac{1}{4}, \frac{2}{8}, \frac{3}{12}, \quad, \quad, \dots$

6. $\frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \quad, \quad, \dots$

7. $\frac{3}{4}, \frac{6}{8}, \frac{9}{12}, \quad, \quad, \dots$

8. $\frac{1}{8}, \frac{2}{16}, \quad , \quad , \quad , \dots$

9. $\frac{2}{5}, \frac{4}{10}, \quad , \quad , \quad , \dots$

10. $\frac{5}{6}$, , , , , , \dots

11. $\frac{1}{10}, \quad , \quad , \quad , \quad , \dots$

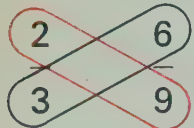
12. $\frac{1}{6}$, , , , , ...

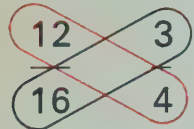
13. $\frac{3}{8}, \quad , \quad , \quad , \quad , \dots$

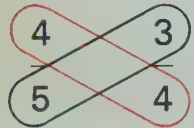
14. $\frac{5}{9}$, , , , , , ...

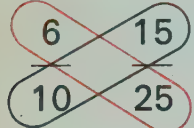
15. $\frac{7}{12}, \quad , \quad , \quad , \quad , \dots$

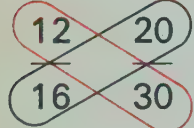
1. Find each product. Then write **is** or **is not** in the blank at the right.

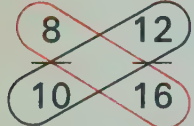
A  $3 \times 6 = \underline{\hspace{2cm}}$
 $2 \times 9 = \underline{\hspace{2cm}}$ } $\longrightarrow \frac{2}{3}$ _____ equivalent to $\frac{6}{9}$.

B  $16 \times 3 = \underline{\hspace{2cm}}$
 $12 \times 4 = \underline{\hspace{2cm}}$ } $\longrightarrow \frac{12}{16}$ _____ equivalent to $\frac{3}{4}$.

C  $5 \times 3 = \underline{\hspace{2cm}}$
 $4 \times 4 = \underline{\hspace{2cm}}$ } $\longrightarrow \frac{4}{5}$ _____ equivalent to $\frac{3}{4}$.

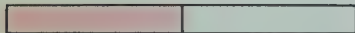


D  $10 \times 15 = \underline{\hspace{2cm}}$
 $6 \times 25 = \underline{\hspace{2cm}}$ } $\longrightarrow \frac{6}{10}$ _____ equivalent to $\frac{15}{25}$.




E  $16 \times 20 = \underline{\hspace{2cm}}$
 $12 \times 30 = \underline{\hspace{2cm}}$ } $\longrightarrow \frac{12}{16}$ _____ equivalent to $\frac{20}{30}$.



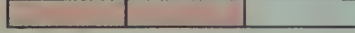
F  $10 \times 12 = \underline{\hspace{2cm}}$
 $8 \times 16 = \underline{\hspace{2cm}}$ } $\longrightarrow \frac{8}{10}$ _____ equivalent to $\frac{12}{16}$.

2. Write the two fractions suggested by the shaded part of the regions. Then, by looking at the picture, tell whether the first fraction **is** or **is not** equivalent to the second fraction. Use the cross-product method to check your results.

Check

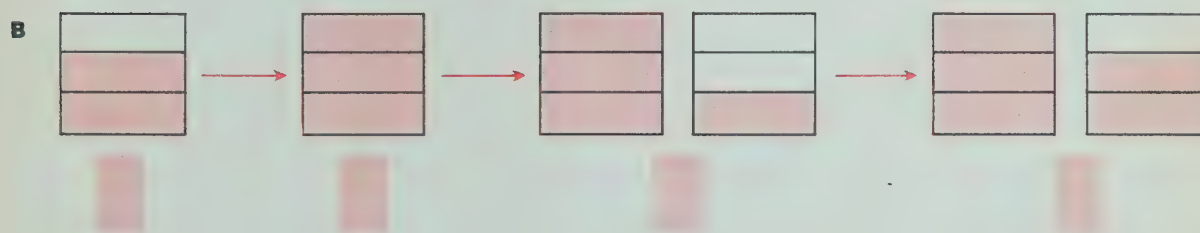
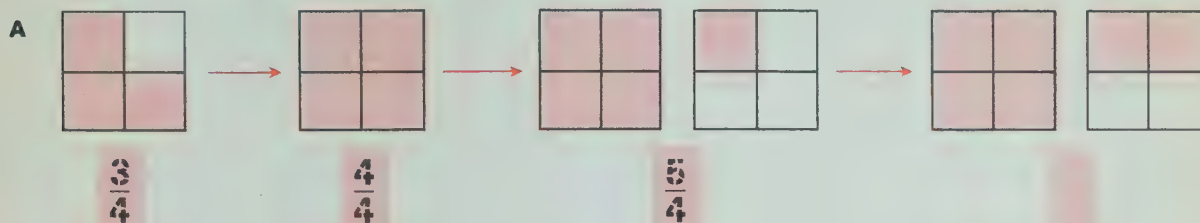
A  \longrightarrow _____ equivalent to  .
 \longrightarrow _____

B  \longrightarrow _____ equivalent to  .
 \longrightarrow _____

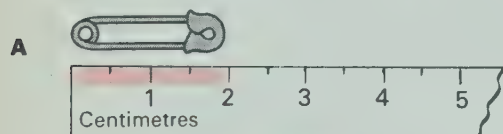
C  \longrightarrow _____ equivalent to  .
 \longrightarrow _____

An **improper fraction** is a fraction whose numerator is equal to or greater than its denominator.

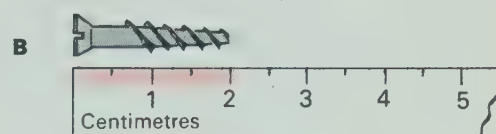
1. Regions can help you think of improper fractions. For each part of each exercise, give the fraction suggested by the region or regions.



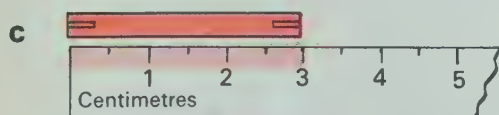
2. Measurement can help you think of improper fractions. Give the fractions suggested by the pictures.



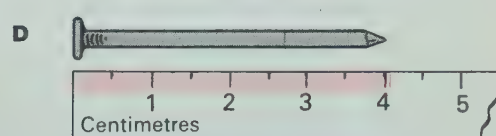
The fraction $\frac{5}{2}$ compares the pin with a centimetre.



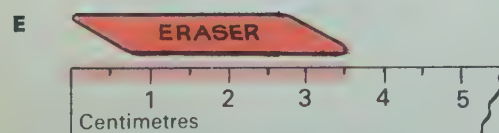
The fraction $\frac{5}{2}$ compares the screw with a centimetre.



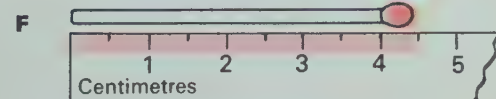
The fraction $\frac{3}{2}$ compares the rod with a centimetre.



The fraction $\frac{4}{2}$ compares the nail with a centimetre.



The fraction $\frac{7}{2}$ compares the eraser with a centimetre.



The fraction $\frac{9}{2}$ compares the match with a centimetre.

1. Give the missing fractions in each set of equivalent fractions.

A $\left\{ \frac{\quad}{\quad}, \frac{2}{10}, \frac{3}{15}, \frac{4}{20}, \frac{5}{25}, \dots \right\}$

G $\left\{ \frac{\quad}{\quad}, \frac{8}{6}, \frac{12}{9}, \frac{16}{12}, \frac{20}{15}, \dots \right\}$

B $\left\{ \frac{\quad}{\quad}, \frac{6}{16}, \frac{9}{24}, \frac{12}{32}, \frac{15}{40}, \dots \right\}$

H $\left\{ \frac{\quad}{\quad}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \frac{5}{10}, \dots \right\}$

C $\left\{ \frac{\quad}{\quad}, \frac{8}{10}, \frac{12}{15}, \frac{16}{20}, \frac{20}{25}, \dots \right\}$

I $\left\{ \frac{\quad}{\quad}, \frac{6}{2}, \frac{9}{3}, \frac{12}{4}, \frac{15}{5}, \dots \right\}$

D $\left\{ \frac{\quad}{\quad}, \frac{14}{20}, \frac{21}{30}, \frac{28}{40}, \frac{35}{50}, \dots \right\}$

J $\left\{ \frac{\quad}{\quad}, \frac{12}{10}, \frac{18}{15}, \frac{24}{20}, \frac{30}{25}, \dots \right\}$

E $\left\{ \frac{\quad}{\quad}, \frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \frac{10}{15}, \dots \right\}$

K $\left\{ \frac{\quad}{\quad}, \frac{14}{16}, \frac{21}{24}, \frac{28}{32}, \frac{35}{40}, \dots \right\}$

F $\left\{ \frac{\quad}{\quad}, \frac{10}{18}, \frac{15}{27}, \frac{20}{36}, \frac{25}{45}, \dots \right\}$

L $\left\{ \frac{\quad}{\quad}, \frac{6}{20}, \frac{9}{30}, \frac{12}{40}, \frac{15}{50}, \dots \right\}$

2. Each fraction you found in exercise 1 is a fraction in **lowest terms**. The numerator and denominator of lowest-terms fractions have no common factors other than 1. Put a ring around the fractions below that are in lowest terms.

A $\frac{6}{8}$

B $\frac{7}{8}$

C $\frac{1}{6}$

D $\frac{2}{6}$

E $\frac{3}{10}$

F $\frac{4}{10}$

G $\frac{5}{10}$

H $\frac{6}{25}$

3. Find the lowest-terms fraction for each set of equivalent fractions.

A $\left\{ \frac{\quad}{\quad}, \frac{2}{20}, \frac{3}{30}, \frac{4}{40}, \frac{5}{50}, \dots \right\}$

G $\left\{ \frac{\quad}{\quad}, \frac{2}{14}, \frac{3}{21}, \frac{4}{28}, \frac{5}{35}, \dots \right\}$

B $\left\{ \frac{\quad}{\quad}, \frac{6}{4}, \frac{9}{6}, \frac{12}{8}, \frac{15}{10}, \dots \right\}$

H $\left\{ \frac{\quad}{\quad}, \frac{14}{10}, \frac{21}{15}, \frac{28}{20}, \frac{35}{25}, \dots \right\}$

C $\left\{ \frac{\quad}{\quad}, \frac{4}{10}, \frac{6}{15}, \frac{8}{20}, \frac{10}{25}, \dots \right\}$

I $\left\{ \frac{\quad}{\quad}, \frac{4}{18}, \frac{6}{27}, \frac{8}{36}, \frac{10}{45}, \dots \right\}$

D $\left\{ \frac{\quad}{\quad}, \frac{10}{16}, \frac{15}{24}, \frac{20}{32}, \frac{25}{40}, \dots \right\}$

J $\left\{ \frac{\quad}{\quad}, \frac{2}{8}, \frac{3}{12}, \frac{4}{16}, \frac{5}{20}, \dots \right\}$

E $\left\{ \frac{\quad}{\quad}, \frac{2}{24}, \frac{3}{36}, \frac{4}{48}, \frac{5}{60}, \dots \right\}$

K $\left\{ \frac{\quad}{\quad}, \frac{6}{2}, \frac{9}{3}, \frac{12}{4}, \frac{15}{5}, \dots \right\}$

F $\left\{ \frac{\quad}{\quad}, \frac{6}{8}, \frac{9}{12}, \frac{12}{16}, \frac{15}{20}, \dots \right\}$

L $\left\{ \frac{\quad}{\quad}, \frac{2}{2}, \frac{3}{3}, \frac{4}{4}, \frac{5}{5}, \dots \right\}$

4. Give the lowest-terms fraction for each fraction below. Your work in exercises 1 and 3 will help you.

A $\frac{4}{20}$ _____

B $\frac{4}{6}$ _____

C $\frac{6}{10}$ _____

D $\frac{9}{24}$ _____

E $\frac{21}{24}$ _____

F $\frac{6}{8}$ _____

G $\frac{5}{10}$ _____

H $\frac{2}{14}$ _____

I $\frac{3}{12}$ _____

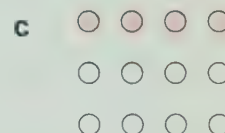
J $\frac{20}{32}$ _____

1. Give three more fractions for each set.

A $\left\{ \frac{1}{5}, \frac{2}{5}, \frac{3}{5}, \dots \right\}$

B $\left\{ \frac{1}{8}, \frac{2}{8}, \frac{3}{8}, \frac{4}{8}, \dots \right\}$

2. Sometimes you can use different fractions to express the same idea. Give the missing numerators.

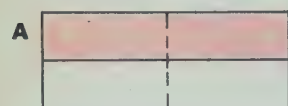


$\frac{2}{3}$ of the dots are colored.

$\frac{2}{6}$ of the dots are colored.

$\frac{4}{12}$ of the dots are colored.

3. Give the missing numerators. Then write a lowest-terms fraction for each part.



$\frac{2}{4}$ of the region is colored.

$\frac{4}{12}$ of the region is colored.

$\frac{4}{10}$ of the region is colored.

In lowest terms, it is $\frac{1}{2}$.

In lowest terms, it is $\frac{1}{3}$.

In lowest terms, it is $\frac{2}{5}$.

Solve the short story problems. Give each answer in lowest terms when possible.

4. 20 students in a room.
6 students wear glasses.
What fraction of the students wear glasses?

5. All but 4 out of 30 people are on the bus.
What fraction of the people are not on the bus? _____

6. 6 out of 10 classrooms are newly painted. What fraction of the rooms are painted? _____

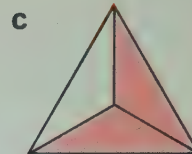
7. An automobile trip took 16 hours. Two hours of this time was for eating and resting.

- A What fraction of the trip was spent eating and resting? _____

- B What fraction of the trip was spent in driving? _____

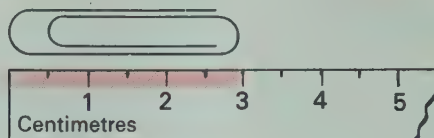
8. 36 cars started in a race. 20 of them finished. What fraction of the cars finished? _____

1. Give the fraction suggested by the shaded part of each region.

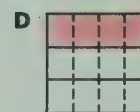
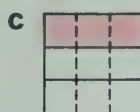
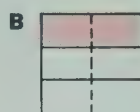
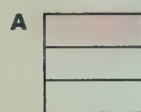


2. Give an improper fraction that compares

the paper clip with the cm. _____



3. Give the fraction suggested by the shaded part of each figure.



4. Give 3 more fractions for each set of equivalent fractions.

A $\left\{ \frac{3}{8}, \frac{6}{16}, \frac{\quad}{\quad}, \frac{\quad}{\quad}, \frac{\quad}{\quad}, \dots \right\}$

B $\left\{ \frac{5}{4}, \frac{10}{8}, \frac{\quad}{\quad}, \frac{\quad}{\quad}, \frac{\quad}{\quad}, \dots \right\}$

5. Are the two fractions equivalent?
Answer **yes** or **no**.

A $\frac{2}{4}, \frac{6}{12}$ _____

B $\frac{6}{9}, \frac{20}{30}$ _____

C $\frac{5}{4}, \frac{9}{7}$ _____

D $\frac{1}{7}, \frac{13}{91}$ _____

6. Give the lowest-terms fraction for each fraction.

A $\frac{9}{12}$ _____

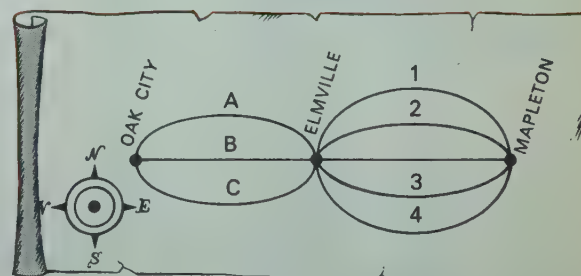
B $\frac{50}{70}$ _____

C $\frac{15}{20}$ _____

D $\frac{18}{24}$ _____

CHANGE OF PACE

There are 3 roads (A, B, and C) from Oak City to Elmville. There are 4 roads (1, 2, 3, and 4) from Elmville to Mapleton. This gives 12 ways that you can travel from Oak City through Elmville to Mapleton. List them.



A-1, A-2, A-3, A-4, B-1, B-2, _____, _____, _____, _____, _____, _____.

1. If Road C is closed, in how many ways can you make the trip? _____

2. If Road C is reopened and Road 2 is closed, in how many ways can you make the trip? _____

3. If both Road C and Road 2 are closed, in how many ways can you make the trip? _____

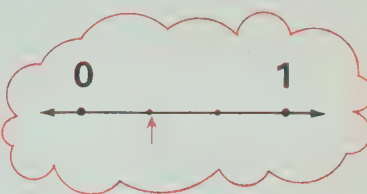
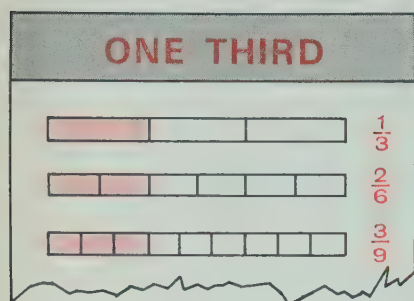
For each set of
equivalent fractions



we think of **one
fractional number**



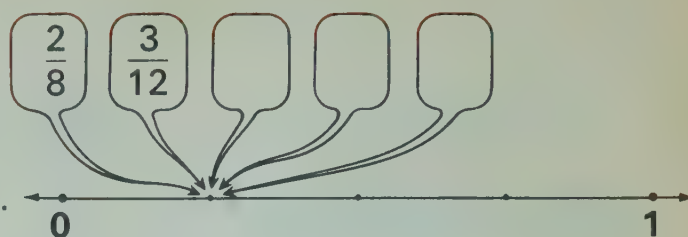
and **one point** on
the number line.



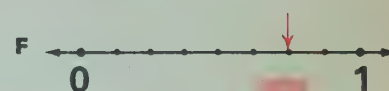
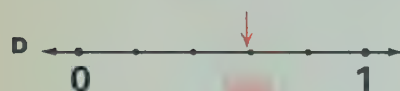
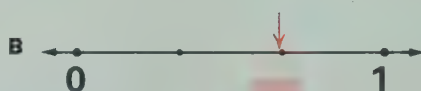
For each set of equivalent fractions there is one rational number. Put a ring around the point for the number.

	Set of fractions for the number	Which point on the number line goes with the number?
1.	$\{\frac{2}{5}, \frac{4}{10}, \frac{6}{15}, \frac{8}{20}, \dots\}$	
2.	$\{\frac{3}{4}, \frac{6}{8}, \frac{9}{12}, \frac{12}{16}, \dots\}$	
3.	$\{\frac{4}{5}, \frac{8}{10}, \frac{12}{15}, \frac{16}{20}, \dots\}$	
4.	$\{\frac{5}{8}, \frac{10}{16}, \frac{15}{24}, \frac{20}{32}, \dots\}$	
5.	$\{\frac{1}{4}, \frac{2}{8}, \frac{3}{12}, \frac{4}{16}, \dots\}$	
6.	$\{\frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \dots\}$	
7.	$\{\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \dots\}$	
8.	$\{\frac{3}{5}, \frac{6}{10}, \frac{9}{15}, \frac{12}{20}, \dots\}$	

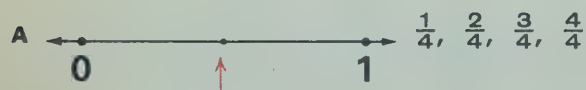
1. Any fraction from a set of equivalent fractions can be used to name the fractional number for that set. In the example on the right, two names are given for the number for the point. Give three other fractions that name this same number.



2. What is the **lowest-terms** fraction that names the number in exercise 1? _____
3. For each exercise, give the lowest-terms fraction that names the fractional for the point under the colored arrow.

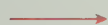
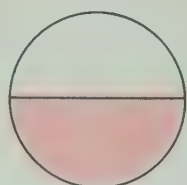


4. Put a ring around the fraction that names the fractional number for the point over the colored arrow.

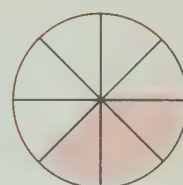


1. Write an inequality for each exercise.

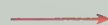
Example:

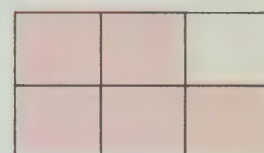


$$\frac{1}{2} > \frac{3}{8}$$

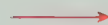
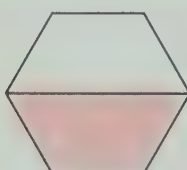


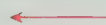
A



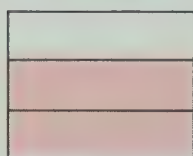


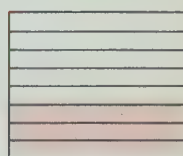
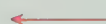
B



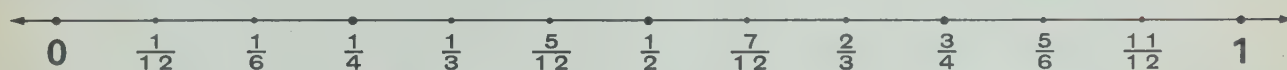


C





2. Use the number line to give the correct sign (< or >) in each



- A $\frac{1}{3}$ $\frac{1}{2}$ C $\frac{7}{12}$ $\frac{2}{3}$ E $\frac{5}{6}$ $\frac{2}{3}$ G $\frac{5}{6}$ $\frac{11}{12}$ I $\frac{1}{12}$ $\frac{1}{4}$
- B $\frac{5}{12}$ $\frac{1}{4}$ D $\frac{1}{2}$ $\frac{5}{12}$ F $\frac{1}{2}$ $\frac{2}{3}$ H $\frac{2}{3}$ $\frac{7}{12}$ J $\frac{1}{3}$ $\frac{1}{6}$

3. Give the missing numerators. Then give the correct sign (< or >) in each .

- A $\frac{1}{2} = \frac{\text{red circle}}{6}$ } $\frac{1}{2}$ $\frac{1}{3}$
 $\frac{1}{3} = \frac{\text{red circle}}{6}$
- B $\frac{3}{8} = \frac{\text{red circle}}{8}$ } $\frac{3}{8}$ $\frac{1}{2}$
 $\frac{1}{2} = \frac{\text{red circle}}{8}$
- C $\frac{3}{4} = \frac{\text{red circle}}{20}$ } $\frac{3}{4}$ $\frac{7}{10}$
 $\frac{7}{10} = \frac{\text{red circle}}{20}$
- D $\frac{3}{10} = \frac{\text{red circle}}{30}$ } $\frac{3}{10}$ $\frac{1}{3}$
 $\frac{1}{3} = \frac{\text{red circle}}{30}$
- E $\frac{7}{12} = \frac{\text{red circle}}{12}$ } $\frac{7}{12}$ $\frac{5}{6}$
 $\frac{5}{6} = \frac{\text{red circle}}{12}$
- F $\frac{5}{12} = \frac{\text{red circle}}{12}$ } $\frac{5}{12}$ $\frac{1}{4}$
 $\frac{1}{4} = \frac{\text{red circle}}{12}$

1. Walked $\frac{7}{10}$ km.
Ran $\frac{1}{2}$ km.

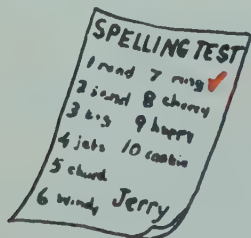
Which is farther? _____



2. Need $\frac{2}{3}$ glass of water.
Filled glass $\frac{1}{2}$ full.
Need **more** or **less** water?

3. $\frac{3}{8}$ of the group are women.
 $\frac{1}{4}$ are men.
Are there more **men** or
women? _____

4. Drove $\frac{3}{5}$ of the way to town.
Is this **more** or **less** than
half way? _____



5. Spelling test: 9 out of 10
correct. Is this **better** or
worse than $\frac{4}{5}$ of the words
correct? _____

6. Lunch: $\frac{1}{2}$ hour.
Recess: $\frac{1}{3}$ hour.

Which is longer? _____

7. Bob took $\frac{1}{6}$ of the stamps.
Tom took $\frac{1}{8}$ of them.
Who took more stamps?



8. Number-line point for $\frac{17}{20}$.
Number-line point for $\frac{35}{40}$.
Which point is farther to
the right? _____



9. Material for a scarf: $\frac{3}{4}$ yard.
Material for a tie: $\frac{2}{3}$ yard.
Which item takes more material?

10. One way to school is about $\frac{5}{8}$ of
a km. Is this **more** or **less**
than $\frac{3}{4}$ of a km? _____

Strip A is $\frac{3}{4}$ as long as strip B.

We say the **ratio** of the length of strip A to the length of strip B is **3 to 4**.

This ratio is written as **3:4**.



1. Give the ratio that compares the length of the top strip to the length of the lower strip.

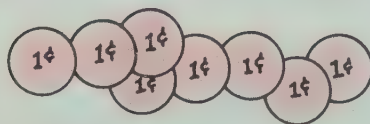








2. Give the ratio for each part.



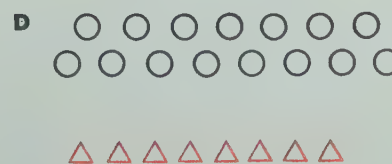
Ratio of to is _____.



Ratio of to is _____.

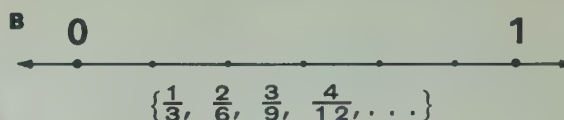
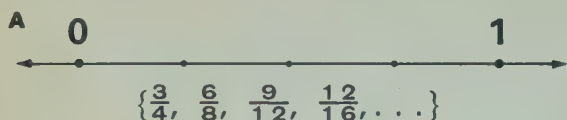


Ratio of to is _____.

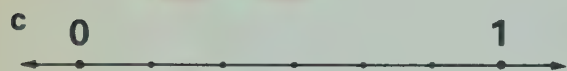
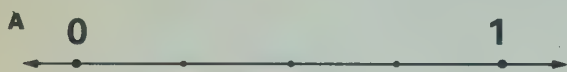


Ratio of to is _____.

1. Ring the point for the fractional number indicated by the set of equivalent fractions.



2. Give the lowest-terms fraction in each .



3. Give the correct sign ($<$, $=$, or $>$) in each .

A $\frac{1}{2}$ $\frac{5}{10}$

C $\frac{1}{4}$ $\frac{1}{3}$

E $\frac{5}{8}$ $\frac{3}{4}$

G $\frac{1}{8}$ $\frac{1}{10}$

I $\frac{5}{6}$ $\frac{10}{12}$

B $\frac{6}{8}$ $\frac{3}{4}$

D $\frac{2}{5}$ $\frac{2}{6}$

F $\frac{1}{3}$ $\frac{4}{12}$

H $\frac{3}{5}$ $\frac{4}{5}$

J $\frac{7}{10}$ $\frac{7}{8}$

4. Sally lives $\frac{1}{5}$ of a km from school. Mike lives $\frac{1}{4}$ of a km from school. Who lives farther from school? _____

5. There are 5 baseball bats and 14 players. What is the ratio of bats to players? _____

CHANGE OF PACE

Unscramble the symbols to make a symbol for the given number.

Example: $\times, (, 2, -,), 4, 5 \longrightarrow \underline{(2 \times 5) - 4} = 6$

1. $3, \div, 2, (, \times,), 8 \longrightarrow \underline{\hspace{2cm}} = 12$

2. $5, \times,), 2, (, +, 3 \longrightarrow \underline{\hspace{2cm}} = 16$

3. $2, \div,), 2, (, 8, \div \longrightarrow \underline{\hspace{2cm}} = 2$

4. $\div, 9, (,), 3, -, 2 \longrightarrow \underline{\hspace{2cm}} = 1$

5. $3, 3, 3, \times, \times, (,), -, 7 \longrightarrow \underline{\hspace{2cm}} = 20$

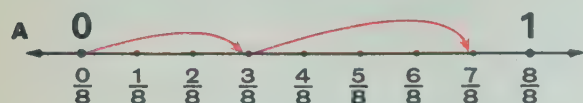
6. $4, \div, +, 2, 4,), (, \longrightarrow \underline{\hspace{2cm}} = 4$

7. $3,), \div, 6, (, \times, 9 \longrightarrow \underline{\hspace{2cm}} = 2$

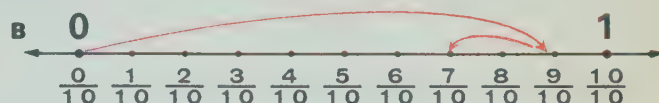
Addition and Subtraction of Fractional Numbers

● Addition and Subtraction

1. Write an equation for each number-line picture.



$$\frac{3}{8} + \frac{4}{8} = \underline{\hspace{2cm}}$$

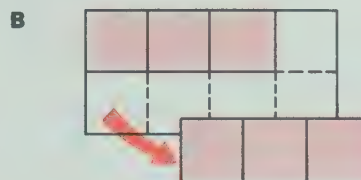


$$\underline{\hspace{2cm}}$$

2. Use the figures to help you solve the equations.



$$\frac{5}{8} + \frac{2}{8} = \underline{\hspace{2cm}}$$



$$\frac{6}{8} - \frac{3}{8} = \underline{\hspace{2cm}}$$

3. Find the sums and differences.

A $\frac{7}{8} - \frac{1}{8} = \underline{\hspace{2cm}}$

D $\frac{11}{2} - \frac{7}{2} = \underline{\hspace{2cm}}$

G $\frac{3}{20} + \frac{15}{20} = \underline{\hspace{2cm}}$

J $\frac{35}{50} - \frac{20}{50} = \underline{\hspace{2cm}}$

B $\frac{17}{10} - \frac{3}{10} = \underline{\hspace{2cm}}$

E $\frac{5}{2} + \frac{8}{2} = \underline{\hspace{2cm}}$

H $\frac{17}{24} - \frac{16}{24} = \underline{\hspace{2cm}}$

K $\frac{6}{75} - \frac{6}{75} = \underline{\hspace{2cm}}$

C $\frac{5}{12} + \frac{8}{12} = \underline{\hspace{2cm}}$

F $\frac{4}{3} + \frac{9}{3} = \underline{\hspace{2cm}}$

I $\frac{1}{38} + \frac{1}{38} = \underline{\hspace{2cm}}$

L $\frac{14}{80} + \frac{30}{80} = \underline{\hspace{2cm}}$

4. Solve each short story problem.

- A** Cindy used $\frac{2}{4}$ litre of water in a cake recipe. Then she put in $\frac{1}{4}$ litre more of water. How much water did she use in all? $\underline{\hspace{2cm}}$

- B** Jody lives $\frac{5}{10}$ of a kilometre from school. Elaine lives only $\frac{1}{10}$ of a kilometre from school. How much farther does Jody live from school than Elaine? $\underline{\hspace{2cm}}$

- C** Joan ate $\frac{2}{6}$ of the pie. Pam ate $\frac{3}{6}$ of it. What part of the pie did the girls eat altogether? $\underline{\hspace{2cm}}$

- D** Mark had a piece of wood $\frac{9}{10}$ m long. He cut off $\frac{3}{10}$ m. How long was the piece of wood after the cut? $\underline{\hspace{2cm}}$

Give the missing fractional numbers.

Numbers to be added
or subtracted

Sets of fractions
for the numbers

Finding the sum or
difference of the numbers

1. $\frac{1}{3} + \frac{1}{4}$ $\left\{ \frac{1}{3}, \frac{2}{6}, \frac{3}{9}, \frac{4}{12}, \dots \right\}$ $\frac{4}{12} + \frac{3}{12} =$ $\left\{ \frac{1}{4}, \frac{2}{8}, \frac{3}{12}, \frac{4}{16}, \dots \right\}$

2. $\frac{1}{2} - \frac{1}{3}$ $\left\{ \frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \dots \right\}$ $\frac{3}{6} - \frac{2}{6} =$ $\left\{ \frac{1}{3}, \frac{2}{6}, \frac{3}{9}, \frac{4}{12}, \dots \right\}$

3. $\frac{3}{8} + \frac{1}{6}$ $\left\{ \frac{3}{8}, \frac{6}{16}, \frac{9}{24}, \frac{12}{32}, \dots \right\}$ $\square + \square =$ $\left\{ \frac{1}{6}, \frac{2}{12}, \frac{3}{18}, \frac{4}{24}, \dots \right\}$

4. $\frac{2}{3} - \frac{1}{5}$ $\left\{ \frac{2}{3}, \frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \frac{10}{15}, \dots \right\}$ $\square - \square =$ $\left\{ \frac{1}{5}, \frac{2}{10}, \frac{3}{15}, \frac{4}{20}, \dots \right\}$

5. $\frac{3}{5} + \frac{1}{4}$ $\left\{ \frac{3}{5}, \frac{6}{10}, \frac{9}{15}, \frac{12}{20}, \dots \right\}$ $\square + \square =$ $\left\{ \frac{1}{4}, \frac{2}{8}, \frac{3}{12}, \frac{4}{16}, \frac{5}{20}, \dots \right\}$

6. $\frac{4}{9} - \frac{1}{6}$ $\left\{ \frac{4}{9}, \frac{8}{18}, \frac{12}{27}, \frac{16}{36}, \dots \right\}$ $\square - \square =$ $\left\{ \frac{1}{6}, \frac{2}{12}, \frac{3}{18}, \frac{4}{24}, \dots \right\}$

List as many fractions as you need to find two with the same denominator.
Then complete the exercises.

Numbers to be added
or subtracted

Sets of fractions
for the numbers

Finding the sum or
difference of the numbers

1. $\frac{2}{3} - \frac{1}{4}$

$\left\{ \frac{2}{3}, \right.$

$\left\{ \frac{1}{4}, \right.$

$\square - \square = \square$

2. $\frac{1}{2} + \frac{2}{5}$

$\left\{ \frac{1}{2}, \right.$

$\left\{ \frac{2}{5}, \right.$

$\square + \square = \square$

3. $\frac{5}{8} - \frac{1}{6}$

$\left\{ \frac{5}{8}, \right.$

$\left\{ \frac{1}{6}, \right.$

$\square - \square = \square$

4. $\frac{1}{9} + \frac{5}{6}$

$\left\{ \frac{1}{9}, \right.$

$\left\{ \frac{5}{6}, \right.$

$\square + \square = \square$

5. $\frac{3}{4} - \frac{1}{3}$

$\left\{ \frac{3}{4}, \right.$

$\left\{ \frac{1}{3}, \right.$

$\square - \square = \square$

6. $\frac{1}{4} + \frac{3}{5}$

$\left\{ \frac{1}{4}, \right.$

$\left\{ \frac{3}{5}, \right.$

$\square + \square = \square$

1. A List the first five multiples of 6. 0, 6, 12, 18, 24
- B List the first five multiples of 4. 4, 8, 12, 16, 20
- C What is the least common multiple of 6 and 4? 12
- D What is the least common denominator for $\frac{1}{6}$ and $\frac{3}{4}$? 12

E Find the numerators. $\frac{1}{6} = \frac{\boxed{2}}{12}$ $\frac{3}{4} = \frac{\boxed{9}}{12}$

F Find the sums. $\frac{2}{12} + \frac{9}{12} = \frac{\boxed{11}}{12} \rightarrow \frac{1}{6} + \frac{3}{4} = \frac{\boxed{11}}{12}$

2. A List the first six multiples of 5. 5, 10, 15, 20, 25, 30
- B List the first six multiples of 4. 4, 8, 12, 16, 20, 24
- C What is the least common multiple of 5 and 4? 20
- D What is the least common denominator for $\frac{2}{5}$ and $\frac{1}{4}$? 20

E Find the numerators. $\frac{2}{5} = \frac{\boxed{8}}{20}$ $\frac{1}{4} = \frac{\boxed{5}}{20}$

F Find the differences. $\frac{8}{20} - \frac{5}{20} = \frac{\boxed{3}}{20} \rightarrow \frac{2}{5} - \frac{1}{4} = \frac{\boxed{3}}{20}$

3. Give the missing numerators. Then find the sum or difference of the two numbers.

A $\frac{1}{2} + \frac{1}{3}$
 $\frac{\boxed{2}}{6} + \frac{\boxed{2}}{6} = \frac{\boxed{4}}{6}$

B $\frac{3}{4} - \frac{1}{6}$
 $\frac{\boxed{9}}{12} - \frac{\boxed{2}}{12} = \frac{\boxed{7}}{12}$

C $\frac{2}{3} + \frac{1}{6}$
 $\frac{\boxed{4}}{6} + \frac{\boxed{1}}{6} = \frac{\boxed{5}}{6}$

D $\frac{5}{8} - \frac{1}{6}$
 $\frac{\boxed{15}}{24} - \frac{\boxed{4}}{24} = \frac{\boxed{11}}{24}$

E $\frac{1}{9} + \frac{7}{6}$
 $\frac{\boxed{2}}{18} + \frac{\boxed{21}}{18} = \frac{\boxed{23}}{18}$

F $\frac{3}{8} - \frac{1}{12}$
 $\frac{\boxed{9}}{24} - \frac{\boxed{2}}{24} = \frac{\boxed{7}}{24}$

G $\frac{1}{6} + \frac{3}{8}$
 $\frac{\boxed{2}}{24} + \frac{\boxed{9}}{24} = \frac{\boxed{11}}{24}$

H $\frac{4}{15} - \frac{1}{5}$
 $\frac{\boxed{4}}{15} - \frac{\boxed{3}}{15} = \frac{\boxed{1}}{15}$

I $\frac{3}{4} - \frac{2}{3}$
 $\frac{\boxed{9}}{12} - \frac{\boxed{8}}{12} = \frac{\boxed{1}}{12}$

J $\frac{7}{10} + \frac{1}{5}$
 $\frac{\boxed{7}}{10} + \frac{\boxed{2}}{10} = \frac{\boxed{9}}{10}$

K $\frac{5}{6} - \frac{1}{2}$
 $\frac{\boxed{5}}{6} - \frac{\boxed{3}}{6} = \frac{\boxed{2}}{6}$

L $\frac{1}{5} + \frac{1}{7}$
 $\frac{\boxed{2}}{35} + \frac{\boxed{5}}{35} = \frac{\boxed{7}}{35}$

First find the least common denominator and write it in each . Then find each numerator. Finally, give the sum or difference of the two numbers.

1. **Think:**
Least common denominator is

$$\frac{3}{8} = \frac{\quad}{\quad}$$

$$+ \frac{1}{4} = \frac{\quad}{\quad}$$

Sum \rightarrow

2. **Think:**
Least common denominator is

$$\frac{5}{6} = \frac{\quad}{\quad}$$

$$- \frac{1}{4} = \frac{\quad}{\quad}$$

Difference \rightarrow

3. **Think:**
Least common denominator is

$$\frac{3}{4} = \frac{\quad}{\quad}$$

$$+ \frac{2}{3} = \frac{\quad}{\quad}$$

Sum \rightarrow

4. **Think:**
Least common denominator is

$$\frac{2}{9} = \frac{\quad}{\quad}$$

$$- \frac{1}{6} = \frac{\quad}{\quad}$$

Difference \rightarrow

5. $\frac{1}{4} = \frac{\quad}{\quad}$
 $+ \frac{1}{3} = \frac{\quad}{\quad}$

6. $\frac{5}{6} = \frac{\quad}{\quad}$
 $- \frac{1}{3} = \frac{\quad}{\quad}$

7. $\frac{2}{3} = \frac{\quad}{\quad}$
 $+ \frac{1}{5} = \frac{\quad}{\quad}$

8. $\frac{7}{8} = \frac{\quad}{\quad}$
 $- \frac{5}{6} = \frac{\quad}{\quad}$

CHANGE OF PACE

Ring the best answer.

When the hands of the clock next come together the time is:



between
12:00 and 12:05

exactly
12:00

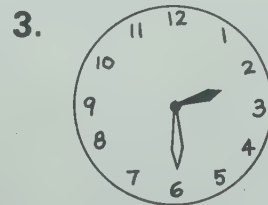
between
11:55 and 12:00



between
8:40 and 8:45

between
8:45 and 9:00

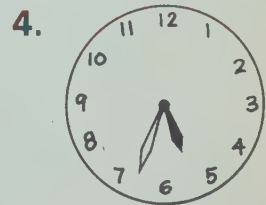
exactly
9:00



between
2:15 and 2:20

between
3:10 and 3:15

between
3:15 and 3:20



between
5:25 and 5:30

between
6:25 and 6:30

between
6:30 and 6:35

1. Write equivalent fractions for each whole number.

A $0 = \frac{0}{1} = \frac{0}{2} = \frac{0}{3} = \square = \square = \square$ E $4 = \frac{4}{1} = \frac{8}{2} = \frac{12}{3} = \square = \square = \square$

B $1 = \frac{1}{1} = \frac{2}{2} = \frac{3}{3} = \square = \square = \square$ F $5 = \frac{5}{1} = \frac{10}{2} = \square = \square = \square = \square$

C $2 = \frac{2}{1} = \frac{4}{2} = \frac{6}{3} = \square = \square = \square$ G $6 = \frac{6}{1} = \square = \square = \square = \square = \square$

D $3 = \frac{3}{1} = \frac{6}{2} = \frac{9}{3} = \square = \square = \square$ H $7 = \square = \square = \square = \square = \square = \square$

2. Each fraction below names a fractional number that you can think of as a whole number. Give the whole number for each fraction.

A $\frac{10}{2}$ ____ B $\frac{12}{3}$ ____ C $\frac{20}{4}$ ____ D $\frac{18}{6}$ ____ E $\frac{7}{7}$ ____ F $\frac{0}{8}$ ____

3. Give the missing numerators.

A $3 = \frac{\square}{2}$ B $6 = \frac{\square}{3}$ C $2 = \frac{\square}{4}$ D $4 = \frac{\square}{2}$ E $5 = \frac{\square}{3}$ F $3 = \frac{\square}{4}$

4. Solve the equations.

A $3\frac{1}{4} = 3 + \square$ B $5\frac{7}{10} = 5 + \square$ C $15\frac{3}{8} = 15 + \square$ D $6\frac{7}{12} = 6 + \square$

5. Match each sum with a mixed numeral, as in the dotted example.

$4 + \frac{1}{3}$	—	$9\frac{1}{2}$
$6 + \frac{7}{8}$	—	$4\frac{1}{3}$
$9 + \frac{1}{2}$	—	$4\frac{3}{8}$
$5 + \frac{7}{10}$	—	$6\frac{7}{8}$
$4 + \frac{3}{8}$	—	$5\frac{7}{10}$

6. Give the correct fraction for each. Fill the blank with the correct mixed numeral.

A Since $\frac{6}{2} = 3 \rightarrow \frac{7}{2} = 3 + \square = \square$
 B Since $\frac{8}{4} = 2 \rightarrow \frac{9}{4} = 2 + \square = \square$
 C Since $\frac{10}{2} = 5 \rightarrow \frac{11}{2} = 5 + \square = \square$
 D Since $\frac{9}{3} = 3 \rightarrow \frac{11}{3} = 3 + \square = \square$
 E Since $\frac{8}{4} = 2 \rightarrow \frac{11}{4} = 2 + \square = \square$
 F Since $\frac{9}{9} = 1 \rightarrow \frac{11}{9} = 1 + \square = \square$

1. Give the missing numerators.

A $2\frac{1}{3} = \frac{\quad}{3} + \frac{1}{3} \rightarrow 2\frac{1}{3} = \frac{\quad}{3}$

E $3\frac{1}{5} = \frac{\quad}{5} + \frac{1}{5} \rightarrow 3\frac{1}{5} = \frac{\quad}{5}$

B $3\frac{1}{2} = \frac{\quad}{2} + \frac{1}{2} \rightarrow 3\frac{1}{2} = \frac{\quad}{2}$

F $4\frac{2}{3} = \frac{\quad}{3} + \frac{2}{3} \rightarrow 4\frac{2}{3} = \frac{\quad}{3}$

C $1\frac{3}{4} = \frac{\quad}{4} + \frac{3}{4} \rightarrow 1\frac{3}{4} = \frac{\quad}{4}$

G $6\frac{1}{2} = \frac{\quad}{2} + \frac{1}{2} \rightarrow 6\frac{1}{2} = \frac{\quad}{2}$

D $2\frac{1}{4} = \frac{\quad}{4} + \frac{1}{4} \rightarrow 2\frac{1}{4} = \frac{\quad}{4}$

H $5\frac{3}{4} = \frac{\quad}{4} + \frac{3}{4} \rightarrow 5\frac{3}{4} = \frac{\quad}{4}$

2. Give the missing numerator for each $\frac{\quad}{\quad}$. Then give the correct whole number for the box. Finally, write the correct mixed numeral in the blank.

A $\frac{7}{2} = \frac{\quad}{2} + \frac{1}{2} \rightarrow \frac{7}{2} = \boxed{\quad} + \frac{1}{2} \rightarrow \frac{7}{2} = \underline{\quad}$

B $\frac{8}{3} = \frac{\quad}{3} + \frac{2}{3} \rightarrow \frac{8}{3} = \boxed{\quad} + \frac{2}{3} \rightarrow \frac{8}{3} = \underline{\quad}$

C $\frac{9}{4} = \frac{\quad}{4} + \frac{1}{4} \rightarrow \frac{9}{4} = \boxed{\quad} + \frac{1}{4} \rightarrow \frac{9}{4} = \underline{\quad}$

D $\frac{12}{5} = \frac{\quad}{5} + \frac{2}{5} \rightarrow \frac{12}{5} = \boxed{\quad} + \frac{2}{5} \rightarrow \frac{12}{5} = \underline{\quad}$

3. Write a mixed numeral for each improper fraction.

A $\frac{14}{9} \underline{\quad}$

C $\frac{11}{3} \underline{\quad}$

E $\frac{16}{5} \underline{\quad}$

G $\frac{13}{4} \underline{\quad}$

I $\frac{113}{10} \underline{\quad}$

B $\frac{21}{20} \underline{\quad}$

D $\frac{21}{8} \underline{\quad}$

F $\frac{19}{2} \underline{\quad}$

H $\frac{23}{6} \underline{\quad}$

J $\frac{47}{5} \underline{\quad}$

4. Write an improper fraction for each mixed numeral.

A $1\frac{5}{6} \underline{\quad}$

C $5\frac{1}{4} \underline{\quad}$

E $8\frac{3}{4} \underline{\quad}$

G $1\frac{9}{50} \underline{\quad}$

I $6\frac{7}{11} \underline{\quad}$

B $3\frac{2}{3} \underline{\quad}$

D $7\frac{1}{10} \underline{\quad}$

F $2\frac{7}{9} \underline{\quad}$

H $10\frac{4}{5} \underline{\quad}$

J $9\frac{37}{100} \underline{\quad}$

1. Because of the commutative and associative principles, you can add any two addends first. Find the sum of the whole numbers and then find the sums of the other two addends. Finally, give the complete sum.

A

Find the sum of these addends.

$2\frac{1}{5} + 3\frac{3}{5} = (2 + \frac{1}{5}) + (3 + \frac{3}{5}) = \square + \square = \underline{\hspace{2cm}}$

Find the sum of these addends.

$\uparrow \qquad \qquad \uparrow$
 $\square + \square = \underline{\hspace{2cm}}$

B $3\frac{5}{8} + 6\frac{2}{8} = (3 + \frac{5}{8}) + (6 + \frac{2}{8}) = \square + \square = \underline{\hspace{2cm}}$

C $1\frac{2}{9} + 4\frac{5}{9} = (1 + \frac{2}{9}) + (4 + \frac{5}{9}) = \square + \square = \underline{\hspace{2cm}}$

2. Give the missing numerators. Then complete the adding.

A $4\frac{1}{3} = 4\frac{\square}{12}$
 $\quad \quad \quad + 2\frac{1}{4} = 2\frac{\square}{12}$

B $2\frac{1}{8} = 2\frac{\square}{8}$
 $\quad \quad \quad + 3\frac{1}{2} = 3\frac{\square}{8}$

C $5\frac{1}{6} = 5\frac{\square}{12}$
 $\quad \quad \quad + 2\frac{1}{4} = 2\frac{\square}{12}$

D $4\frac{1}{9} = 4\frac{\square}{18}$
 $\quad \quad \quad + 7\frac{1}{6} = 7\frac{\square}{18}$

3. Find the sums as you did in exercise 2.

A $\begin{array}{r} 6\frac{1}{2} \\ + 7\frac{1}{3} \\ \hline \end{array}$

B $\begin{array}{r} 4\frac{3}{8} \\ + 1\frac{1}{2} \\ \hline \end{array}$

C $\begin{array}{r} 3\frac{1}{4} \\ + 8\frac{1}{5} \\ \hline \end{array}$

D $\begin{array}{r} 2\frac{2}{3} \\ + 9\frac{1}{6} \\ \hline \end{array}$

E $\begin{array}{r} 5\frac{5}{8} \\ + 8\frac{1}{6} \\ \hline \end{array}$

F $\begin{array}{r} 2\frac{5}{6} \\ + 7\frac{1}{9} \\ \hline \end{array}$

G $\begin{array}{r} 9\frac{3}{4} \\ + 8\frac{1}{8} \\ \hline \end{array}$

H $\begin{array}{r} 5\frac{2}{7} \\ + 6\frac{1}{14} \\ \hline \end{array}$

I $\begin{array}{r} 7\frac{1}{8} \\ + 9\frac{1}{6} \\ \hline \end{array}$

J $\begin{array}{r} 6\frac{3}{10} \\ + 4\frac{2}{5} \\ \hline \end{array}$

K $\begin{array}{r} 3\frac{2}{3} \\ + 2\frac{1}{8} \\ \hline \end{array}$

L $\begin{array}{r} 9\frac{1}{2} \\ + 1\frac{1}{5} \\ \hline \end{array}$

1. Solve the equations. (All fractions should be in lowest terms.)

A $\frac{10}{7} = 1 + \underline{\hspace{1cm}}$	D $\frac{6}{4} = 1 + \underline{\hspace{1cm}}$	G $\frac{12}{8} = 1 + \underline{\hspace{1cm}}$	J $\frac{10}{8} = 1 + \underline{\hspace{1cm}}$
B $\frac{13}{8} = 1 + \underline{\hspace{1cm}}$	E $\frac{8}{6} = 1 + \underline{\hspace{1cm}}$	H $\frac{15}{12} = 1 + \underline{\hspace{1cm}}$	K $\frac{15}{10} = 1 + \underline{\hspace{1cm}}$
C $\frac{5}{4} = 1 + \underline{\hspace{1cm}}$	F $\frac{10}{6} = 1 + \underline{\hspace{1cm}}$	I $\frac{14}{8} = 1 + \underline{\hspace{1cm}}$	L $\frac{14}{10} = 1 + \underline{\hspace{1cm}}$

2. Solve the equations. (All fractions should be in lowest terms.)

A $2\frac{10}{7} = 3 + \underline{\hspace{1cm}}$	D $4\frac{5}{4} = 5 + \underline{\hspace{1cm}}$	G $7\frac{12}{8} = 8 + \underline{\hspace{1cm}}$	J $2\frac{10}{8} = 3 + \underline{\hspace{1cm}}$
B $5\frac{13}{8} = 6 + \underline{\hspace{1cm}}$	E $1\frac{6}{4} = 2 + \underline{\hspace{1cm}}$	H $4\frac{15}{12} = 5 + \underline{\hspace{1cm}}$	K $6\frac{15}{10} = 7 + \underline{\hspace{1cm}}$
C $3\frac{6}{5} = 4 + \underline{\hspace{1cm}}$	F $9\frac{11}{10} = 10 + \underline{\hspace{1cm}}$	I $1\frac{16}{10} = 2 + \underline{\hspace{1cm}}$	L $29\frac{10}{6} = 30 + \underline{\hspace{1cm}}$

3. Give the lowest-terms fraction for each .

A $2\frac{10}{7} = 3$	C $4\frac{5}{4} = 5$	E $7\frac{12}{8} = 8$	G $8\frac{12}{9} = 9$	I $4\frac{8}{6} = 5$
B $5\frac{13}{8} = 6$	D $1\frac{6}{4} = 2$	F $4\frac{15}{12} = 5$	H $\frac{9}{6} = 1$	J $3\frac{14}{8} = 4$

4. Find the sums. Use mixed numerals for your answers.

A $\begin{array}{r} 4\frac{3}{4} \\ + 2\frac{1}{2} \\ \hline \end{array}$	B $\begin{array}{r} 6\frac{5}{8} \\ + 9\frac{3}{4} \\ \hline \end{array}$	C $\begin{array}{r} 3\frac{5}{6} \\ + 2\frac{2}{3} \\ \hline \end{array}$	D $\begin{array}{r} 7\frac{3}{4} \\ + 4\frac{11}{12} \\ \hline \end{array}$
E $\begin{array}{r} 3\frac{5}{8} \\ + 2\frac{1}{4} \\ \hline \end{array}$	F $\begin{array}{r} 7\frac{3}{5} \\ + 1\frac{2}{15} \\ \hline \end{array}$	G $\begin{array}{r} 16\frac{1}{12} \\ + 2\frac{3}{4} \\ \hline \end{array}$	H $\begin{array}{r} 10\frac{2}{5} \\ + 31\frac{13}{20} \\ \hline \end{array}$
I $\begin{array}{r} 95\frac{7}{10} \\ + 61\frac{2}{5} \\ \hline \end{array}$	J $\begin{array}{r} 43\frac{2}{3} \\ + 45\frac{5}{9} \\ \hline \end{array}$	K $\begin{array}{r} 40\frac{1}{3} \\ + 7\frac{5}{8} \\ \hline \end{array}$	L $\begin{array}{r} 38\frac{4}{5} \\ + 72\frac{7}{10} \\ \hline \end{array}$
M $\begin{array}{r} 76\frac{3}{8} \\ + 39\frac{3}{4} \\ \hline \end{array}$	N $\begin{array}{r} 67\frac{9}{16} \\ + 83\frac{3}{4} \\ \hline \end{array}$	O $\begin{array}{r} 57\frac{1}{2} \\ + 19\frac{4}{5} \\ \hline \end{array}$	P $\begin{array}{r} 66\frac{2}{3} \\ + 53\frac{1}{4} \\ \hline \end{array}$

● Subtracting by Renaming Fractional Numbers

1. Give the missing numerators.

A $4\frac{1}{3} = 4\frac{\quad}{6} = 3\frac{\quad}{6}$

D $7\frac{1}{2} = 7\frac{\quad}{8} = 6\frac{\quad}{8}$

G $8\frac{3}{4} = 8\frac{\quad}{8} = 7\frac{\quad}{8}$

B $2\frac{1}{4} = 2\frac{\quad}{8} = 1\frac{\quad}{8}$

E $5\frac{1}{3} = 5\frac{\quad}{9} = 4\frac{\quad}{9}$

H $6\frac{2}{5} = 6\frac{\quad}{15} = 5\frac{\quad}{15}$

C $5\frac{1}{10} = 5\frac{\quad}{20} = 4\frac{\quad}{20}$

F $3\frac{1}{6} = 3\frac{\quad}{12} = 2\frac{\quad}{12}$

I $2\frac{2}{3} = 2\frac{\quad}{15} = 1\frac{\quad}{15}$

2. Give the missing numerator. Then find the difference. Give the difference in lowest terms.

A
$$\begin{array}{r} 6\frac{1}{4} = 6\frac{1}{4} = 5\frac{\quad}{4} \\ - 3\frac{1}{2} = 3\frac{2}{4} = 3\frac{2}{4} \\ \hline \end{array}$$

 $2\frac{3}{4}$

B
$$\begin{array}{r} 7 = 7\frac{0}{8} = 6\frac{\quad}{8} \\ - 2\frac{5}{8} = 2\frac{5}{8} = 2\frac{5}{8} \\ \hline \end{array}$$

C
$$\begin{array}{r} 9\frac{1}{6} = 9\frac{1}{6} = 8\frac{\quad}{6} \\ - 5\frac{2}{3} = 5\frac{4}{6} = 5\frac{4}{6} \\ \hline \end{array}$$

D
$$\begin{array}{r} 7\frac{3}{8} = 7\frac{3}{8} = 6\frac{\quad}{8} \\ - 2\frac{3}{4} = 2\frac{6}{8} = 2\frac{6}{8} \\ \hline \end{array}$$

E
$$\begin{array}{r} 4\frac{2}{5} = 4\frac{4}{10} = 3\frac{\quad}{10} \\ - 3\frac{9}{10} = 3\frac{9}{10} = 3\frac{9}{10} \\ \hline \end{array}$$

F
$$\begin{array}{r} 13\frac{1}{16} = 13\frac{1}{16} = 12\frac{\quad}{16} \\ - 5\frac{1}{4} = 5\frac{4}{16} = 5\frac{4}{16} \\ \hline \end{array}$$

3. Find the differences.

A
$$\begin{array}{r} 9\frac{1}{4} \\ - 2\frac{1}{2} \\ \hline \end{array}$$

B
$$\begin{array}{r} 5\frac{1}{8} \\ - 2\frac{1}{4} \\ \hline \end{array}$$

C
$$\begin{array}{r} 11\frac{2}{3} \\ - 6\frac{5}{6} \\ \hline \end{array}$$

D
$$\begin{array}{r} 13\frac{1}{10} \\ - 9\frac{4}{5} \\ \hline \end{array}$$

E
$$\begin{array}{r} 10\frac{1}{8} \\ - 5\frac{3}{4} \\ \hline \end{array}$$

F
$$\begin{array}{r} 17\frac{3}{5} \\ - 6\frac{7}{10} \\ \hline \end{array}$$

G
$$\begin{array}{r} 14\frac{1}{3} \\ - 6\frac{11}{18} \\ \hline \end{array}$$

H
$$\begin{array}{r} 45\frac{3}{5} \\ - 9\frac{3}{4} \\ \hline \end{array}$$

1. Recess: morning, $\frac{1}{4}$ hour; afternoon, $\frac{1}{3}$ hour. How much recess

in all? _____



2. Monday: $\frac{1}{2}$ cm of rain. Tuesday: $\frac{2}{3}$ cm of rain. How much rain for

the two days? _____

3. Two lots side by side. First lot: $\frac{1}{2}$ hectare Second lot: $\frac{1}{3}$ hectare

How large together? _____



4. Sam's fish: $\frac{3}{4}$ kg.
Joe's fish: $\frac{5}{8}$ kg.

A Whose fish is larger? _____

B How much larger? _____

5. Sue: $152\frac{3}{4}$ cm tall.
Fran: $149\frac{1}{2}$ cm tall.

How much taller is Sue? _____

6. Driving: $52\frac{7}{10}$ km the first hour.
 $49\frac{1}{2}$ km the second hour.

How far in all? _____

7. Box of Sudzy Soap: $112\frac{1}{4}$ grams. Box of Bubbly Soap: $115\frac{2}{3}$ grams. How much more in the Bubbly

Soap box? _____

8. First suitcase: $24\frac{3}{10}$ kilograms. Second suitcase: $31\frac{1}{4}$ kilograms. How much

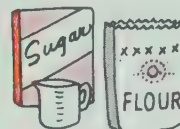
together? _____



9. Normal body temperature: 37°C . $1\frac{1}{2}$ degrees of fever. What is temperature now?

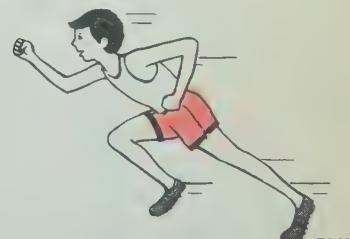
10. Recipe: $1\frac{1}{2}$ litres flour. $2\frac{1}{3}$ litres sugar. How much more

sugar than flour? _____



11. 100-metre dash: First runner, $10\frac{7}{10}$ s. Second runner, $11\frac{1}{2}$ s. By how much time did the first runner

win the race? _____



12. Jim and John on the scales: $124\frac{1}{2}$ kg. Jim got off and the scales read $57\frac{3}{4}$ kg.

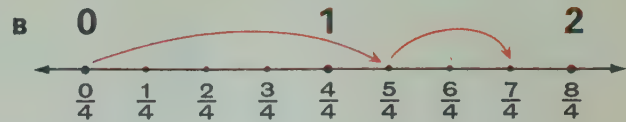
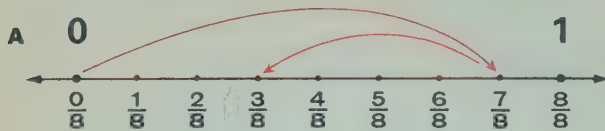
How much does Jim weigh? _____

13. 20 pies for the dinner. Had $\frac{1}{6}$ pie left. Used

how many pies? _____



1. Write an equation for each number-line picture.



2. Give the correct whole number for each fraction.

A $\frac{12}{3}$ _____ **B** $\frac{21}{7}$ _____

3. Solve the equations.

A $2\frac{1}{3} = \underline{\hspace{1cm}} + \frac{1}{3}$ **B** $3\frac{1}{4} = 3 + \underline{\hspace{1cm}}$
C $5 + \underline{\hspace{1cm}} = 5\frac{7}{8}$ **D** $\underline{\hspace{1cm}} + \frac{2}{5} = 8\frac{2}{5}$

4. Find the sums and differences.

A $\frac{1}{7} + \frac{3}{7} = \underline{\hspace{1cm}}$ **B** $\frac{7}{8} - \frac{2}{8} = \underline{\hspace{1cm}}$ **C** $\frac{9}{10} - \frac{2}{10} = \underline{\hspace{1cm}}$ **D** $\frac{5}{7} + \frac{4}{7} = \underline{\hspace{1cm}}$

5. Find the sums and differences. Give your answers in lowest terms.

A $\frac{1}{4} + \frac{2}{3}$ **B** $\frac{5}{6} - \frac{1}{3}$ **C** $2\frac{3}{8} + 6\frac{1}{4}$ **D** $7\frac{3}{4} - 2\frac{1}{2}$
E $4\frac{3}{5} + 6\frac{1}{10}$ **F** $5\frac{7}{12} - 1\frac{1}{3}$ **G** $6\frac{1}{8} - 2\frac{1}{4}$ **H** $52\frac{5}{6} + 39\frac{1}{4}$





CHANGE OF PACE

This is a calendar for September of a certain year. Use days of the week to fill the blanks.

- The last day in August was on _____.
- The first day of October is on _____.
- Fourteen days from September 22 was on _____.
- Twenty days from September 24 was on _____.
- Ten days before the first of September was on _____.
- October has 31 days. October 31 is on _____.

SEPTEMBER						
SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

1. Give the missing decimals.

We see	We think	We write		We say
		Using fractions	Using decimals	
	3 tens, 4 ones, and 6 tenths	$34\frac{6}{10}$	34.6	thirty-four and six tenths
	1 ten, 6 ones, and 5 tenths	$16\frac{5}{10}$		sixteen and five tenths
	1 and 7 tenths	$1\frac{7}{10}$		one and seven tenths
	3 tenths	$\frac{3}{10}$		three tenths

2. Give the correct mixed numeral and the correct decimal.

- A For 2 tens, 6 ones, and 3 tenths, we write $26\frac{3}{10}$ or 26.3.
- B For 7 tens, 2 ones, and 5 tenths, we write _____ or _____.
- C For 3 tens, 3 ones, and 9 tenths, we write _____ or _____.
- D For 9 tens, 8 ones, and 1 tenths, we write _____ or _____.
- E For 2 tenths, 8 ones, and 3 tens, we write _____ or _____.
- F For 4 tens and 8 tenths, we write _____ or _____.

3. Give the correct decimal for each part.

- A $3 + \frac{5}{10}$ _____
- B $7 + \frac{2}{10}$ _____
- C $18 + \frac{9}{10}$ _____
- D $6 + \frac{4}{10}$ _____
- E $\frac{9}{10}$ _____

4. Give the missing numerator or denominator.

- A $23.6 = 23 + \frac{\quad}{10}$
- B $48.7 = 48 + \frac{7}{\quad}$
- C $60.2 = 60 + \frac{\quad}{10}$
- D $2.5 = 2 + \frac{5}{\quad}$
- E $0.7 = \frac{\quad}{10}$

1. Give the correct fractions.

A 6724.385

The 3 in the **tenths** place means $\frac{3}{10}$.

The 8 in the **hundredths** place means _____.

B 5678.234

The 2 in the **tenths** place means _____.

The 4 in the **thousandths** place means _____.

2. Write each decimal as in the example.

$$24.56 = 24 + \frac{5}{10} + \frac{6}{100}$$

A $32.18 =$ _____

B $81.07 =$ _____

C $6.429 =$ _____

3. Write each sum as a decimal. See example.

$$31 + \frac{2}{10} + \frac{5}{100} = 31.25$$

A $59 + \frac{2}{10} + \frac{8}{100} =$ _____

B $8 + \frac{1}{10} + \frac{7}{100} =$ _____

C $125 + \frac{4}{10} + \frac{1}{100} + \frac{7}{1000}$

$=$ _____

4. Screens cover some of the numerators. Give the missing numerators.

A $2.37 = 2 + \frac{3}{10} + \frac{7}{100} = 2 + \frac{30}{100} + \frac{7}{100} = 2 \frac{\quad}{100}$

B $8.46 = 8 + \frac{\quad}{10} + \frac{\quad}{100} = 8 + \frac{\quad}{100} + \frac{6}{100} = 8 \frac{\quad}{100}$

C $5.08 = 5 + \frac{0}{10} + \frac{8}{100} = 5 + \frac{\quad}{100} + \frac{8}{100} = 5 \frac{\quad}{100}$

D $2.643 = 2 + \frac{6}{10} + \frac{4}{100} + \frac{\quad}{1000} = 2 + \frac{600}{1000} + \frac{40}{1000} + \frac{\quad}{1000} = 2 \frac{\quad}{1000}$

5. Screens cover some of the numerals. Give the missing numerals.

A $6 \frac{78}{100} = 6 + \frac{\quad}{100} + \frac{8}{100} = 6 + \frac{\quad}{10} + \frac{8}{100} = 6.\quad\quad$

B $\frac{95}{100} = \frac{90}{100} + \frac{\quad}{100} = \frac{9}{10} + \frac{5}{100} = \quad\quad$

C $\frac{326}{1000} = \frac{300}{1000} + \frac{20}{1000} + \frac{\quad}{1000} = \frac{3}{10} + \frac{\quad}{100} + \frac{6}{1000} = \quad\quad\quad$

D $2 \frac{814}{1000} = 2 + \frac{\quad}{1000} + \frac{10}{1000} + \frac{\quad}{1000} = 2 + \frac{\quad}{10} + \frac{\quad}{100} + \frac{\quad}{1000} = 2.\quad\quad\quad$

1. Write **more** or **less** to complete each sentence.

A 0.6 is _____ than 1.


D 0.14 is _____ than 1.


B 7.1 is _____ than 1.

E 75.57 is _____ than 1.

C 0.498 is _____ than 1.


F 1.003 is _____ than 1.

2. Give the correct sign ($<$, $=$, or $>$) in each 

A 82.4  82.1

C 4.38  4.42

E 7.689  7.687

B 40.2  41.1

D 21.34  2.143

F 0.071  0.710

3. Find the sums and differences.

A $\frac{2}{10} + \frac{6}{10} = 0.2 + 0.6$

B $\frac{7}{10} - \frac{3}{10} = 0.7 - 0.3$

C $\frac{34}{100} + \frac{21}{100} = 0.34 + 0.21$

D $\frac{56}{100} - \frac{24}{100} = 0.56 - 0.24$

E $\frac{9}{10} - \frac{2}{10} = 0.9 - 0.2$

F $\frac{68}{100} + \frac{28}{100} = 0.68 + 0.28$

G $\frac{346}{1000} + \frac{172}{1000} = 0.346 + 0.172$

H $\frac{467}{1000} - \frac{84}{1000} = 0.467 - 0.084$

4. Give the missing numbers.

A Since $\frac{6}{10} + \frac{9}{10} = \frac{15}{10}$ and $\frac{15}{10} = 1 + \frac{5}{10}$, we know that $0.6 + 0.9 = \underline{1.5}$.

B Since $\frac{4}{10} + \frac{8}{10} = \frac{12}{10}$ and $\frac{12}{10} = 1 + \frac{2}{10}$, we know that $0.4 + 0.8 = \underline{\hspace{1cm}}$.

C Since $\frac{82}{100} + \frac{34}{100} = \frac{116}{100}$ and $\frac{116}{100} = 1 + \frac{16}{100}$, we know that $.82 + .34 = \underline{\hspace{1cm}}$.

D Since $2\frac{8}{10} + 5\frac{6}{10} = 7\frac{14}{10}$ and $7\frac{14}{10} = 8 + \frac{4}{10}$, we know that $2.8 + 5.6 = \underline{\hspace{1cm}}$.

E Since $1\frac{75}{100} + 1\frac{43}{100} = 2\frac{118}{100}$ and $2\frac{118}{100} = 3 + \frac{18}{100}$, we know that $1.75 + 1.43 = \underline{\hspace{1cm}}$.

F Since $3\frac{146}{1000} + 2\frac{908}{1000} = 5\frac{1053}{1000}$ and $5\frac{1053}{1000} = 6 + \frac{53}{1000}$, we know that $3.146 + 2.907 = \underline{\hspace{1cm}}$.

1. Give the correct number for each .

$$\frac{8}{100} + \frac{5}{100} = \frac{13}{100}$$

$$\begin{array}{r} 3.48 \\ + 4.85 \\ \hline \end{array}$$

$$\frac{1}{10} + \frac{4}{10} + \frac{8}{10} = \frac{13}{10}$$

$$\begin{array}{r} 1 \\ 3.48 \\ + 4.85 \\ \hline 3 \end{array}$$

$$1 + 3 + 4 = 8$$

$$\begin{array}{r} 1 \\ 3.48 \\ + 4.85 \\ \hline .33 \end{array}$$

2. Complete the adding.

A
$$\begin{array}{r} 1 \\ 7.6 \\ + 9.8 \\ \hline \end{array}$$

 .4

B
$$\begin{array}{r} 1 \\ 3.9 \\ + 2.7 \\ \hline \end{array}$$

 .6

C
$$\begin{array}{r} 1 \\ 5.86 \\ + 2.77 \\ \hline \end{array}$$

 3

D
$$\begin{array}{r} 1 \\ 0.834 \\ + 0.792 \\ \hline \end{array}$$

 26

3. Find the sums.

A
$$\begin{array}{r} 9.3 \\ + 7.4 \\ \hline \end{array}$$

B
$$\begin{array}{r} 6.8 \\ + 2.7 \\ \hline \end{array}$$

C
$$\begin{array}{r} 9.6 \\ + 8.8 \\ \hline \end{array}$$

D
$$\begin{array}{r} 1.72 \\ + 3.46 \\ \hline \end{array}$$

E
$$\begin{array}{r} 7.264 \\ + 8.931 \\ \hline \end{array}$$

4. Give the correct number for each .

$$\frac{7}{10} + \frac{6}{100} = \frac{6}{10} + \frac{16}{100}$$

$$\begin{array}{r} 16 \\ 4.76 \\ - 2.98 \\ \hline \end{array}$$

$$\frac{16}{10} - \frac{8}{10} = \frac{8}{10}$$

$$\begin{array}{r} 6 \quad 16 \\ 4.76 \\ - 2.98 \\ \hline \end{array}$$

$$4\frac{6}{10} = 3\frac{16}{10}$$

$$\begin{array}{r} 3 \quad 16 \quad 16 \\ 4.76 \\ - 2.98 \\ \hline 8 \end{array}$$

$$\frac{16}{10} - \frac{9}{10} = \frac{7}{10}$$

$$\begin{array}{r} 3 \quad 16 \quad 16 \\ 4.76 \\ - 2.98 \\ \hline 8 \end{array}$$

$$3 - 2 = 1$$

$$\begin{array}{r} 3 \quad 16 \quad 16 \\ 4.76 \\ - 2.98 \\ \hline .78 \end{array}$$

5. Complete the subtracting.

A
$$\begin{array}{r} 9.7 \\ - 2.6 \\ \hline \end{array}$$

 .1

B
$$\begin{array}{r} 7 \quad 10 \\ 8.0 \\ - 1.5 \\ \hline \end{array}$$

 .5

C
$$\begin{array}{r} 8 \quad 13 \quad 15 \\ 9.45 \\ - 2.86 \\ \hline \end{array}$$

 59

D
$$\begin{array}{r} 3 \quad 11 \\ 0.641 \\ - 0.277 \\ \hline \end{array}$$

 4

6. Find the differences.

A
$$\begin{array}{r} 7.1 \\ - 2.5 \\ \hline \end{array}$$

B
$$\begin{array}{r} 6.24 \\ - 1.36 \\ \hline \end{array}$$

C
$$\begin{array}{r} 6.00 \\ - 2.87 \\ \hline \end{array}$$

D
$$\begin{array}{r} 9.134 \\ - 6.551 \\ \hline \end{array}$$

E
$$\begin{array}{r} 8.364 \\ - 1.777 \\ \hline \end{array}$$

1. Find the total amounts.

A $\begin{array}{r} \$6.74 \\ 3.87 \\ \hline \end{array}$

B $\begin{array}{r} \$4.56 \\ 7.98 \\ \hline \end{array}$

C $\begin{array}{r} \$3.27 \\ 4.83 \\ \hline \end{array}$

D $\begin{array}{r} \$19.85 \\ 6.88 \\ \hline \end{array}$

E $\begin{array}{r} \$23.49 \\ 19.88 \\ \hline \end{array}$

2. Find the difference in the amounts.

A $\begin{array}{r} \$6.15 \\ 1.50 \\ \hline \end{array}$

B $\begin{array}{r} \$7.18 \\ 2.98 \\ \hline \end{array}$

C $\begin{array}{r} \$5.00 \\ 1.65 \\ \hline \end{array}$

D $\begin{array}{r} \$12.84 \\ 7.98 \\ \hline \end{array}$

E $\begin{array}{r} \$54.60 \\ 17.45 \\ \hline \end{array}$

3. It took 8.7 litres of gasoline to fill a 16-litre tank. How much gasoline was in the tank before the gasoline was added? _____



7. The two best batters on the baseball team had averages of 0.341 and 0.328. By how much did the averages differ? _____



4. Jane bought a dress for \$12.95 and a purse for \$3.49. How much did she spend? _____



5. Normal body temperature is 37.0°C . When Tom had measles, he had 1.8 degrees of fever. What was his temperature? _____

8. When weather was fair the barometer read 102.11. As a storm approached the barometer dropped to 99.62. By how much did the pressure drop? _____

9. The diameter of an axle is 0.74 cm. The plans call for a diameter of 0.69 cm. By how much must the diameter be reduced? _____



6. Before Mr. Brown started on his trip, his odometer read 15 284.6 km. When he returned it read 18 421.2. How far did he drive? _____

1. Give the numerators.

A $6.43 = 6 + \frac{\quad}{10} + \frac{\quad}{100}$

B $8.236 = 8 + \frac{\quad}{10} + \frac{\quad}{100} + \frac{\quad}{1000}$

2. Give the decimal for each sum.

A $7 + \frac{2}{10} + \frac{5}{100} = \underline{\hspace{2cm}}$

B $8 + \frac{6}{10} + \frac{7}{100} + \frac{8}{1000} = \underline{\hspace{2cm}}$

3. Give the fraction suggested by each decimal.

A $0.3 = \underline{\hspace{2cm}}$

B $0.08 = \underline{\hspace{2cm}}$

C $0.002 = \underline{\hspace{2cm}}$

D $0.18 = \underline{\hspace{2cm}}$

E $0.018 = \underline{\hspace{2cm}}$

F $0.150 = \underline{\hspace{2cm}}$

4. For each exercise, put a ring around the decimal that represents the larger number.

A 0.5, 0.05

B 0.024, 0.24

C 0.36, 0.136

D 0.75, 0.7

E 0.79, 0.81

5. Find the sums and differences.

A
$$\begin{array}{r} 6.8 \\ 2.3 \\ \hline \end{array}$$

B
$$\begin{array}{r} 4.1 \\ - 2.5 \\ \hline \end{array}$$

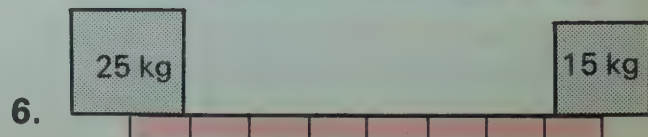
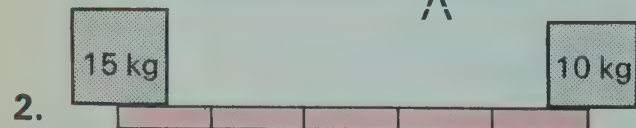
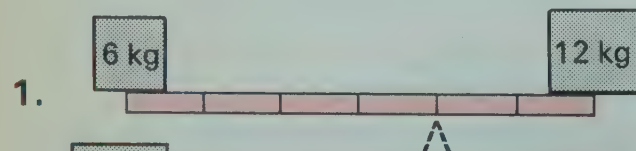
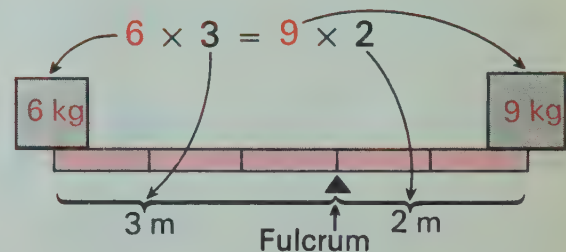
C
$$\begin{array}{r} 7.14 \\ - 1.26 \\ \hline \end{array}$$

D
$$\begin{array}{r} 4.375 \\ + 6.841 \\ \hline \end{array}$$

E
$$\begin{array}{r} 6.234 \\ - 1.705 \\ \hline \end{array}$$

CHANGE OF PACE

In the figure, the weights will balance since the product 6×3 equals the product 9×2 . In the figures below, you are to show where you would place the **fulcrum** (support) so the weights would balance. Remember, the products of the weight and distance from the fulcrum must be equal to balance.



Figures that do not lie on one plane (flat surface) are called **space figures**. The steps in the exercises below show you how to draw pictures of space figures.

1. Cube

Draw a square.

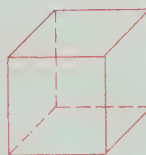
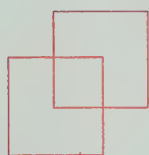
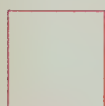


Draw another square.



Connect the corners. Dot the hidden edges.

Draw a cube here.



2. Triangular Prism

Draw a triangle.

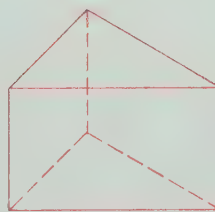
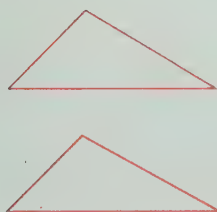


Draw another triangle.



Connect the corners. Dot the hidden edges.

Draw a triangular prism here.



3. Cone

Draw an oval.

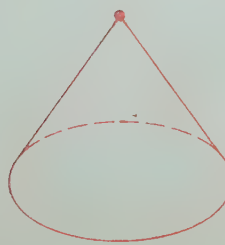


Draw a dot above the oval.



Connect the dot to the oval. Dot the hidden edge.

Draw a cone here.



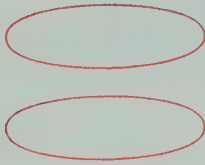
Study the steps in the exercises below. Then draw the space figures in the space provided at the right.

1. Cylinder

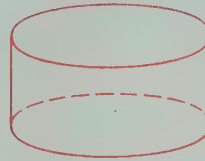
Draw an oval.



Draw another oval.



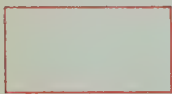
Connect the ovals.
Dot the hidden edge.



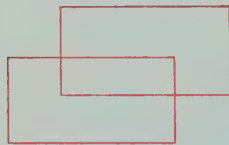
Draw a cylinder here.

2. Rectangular Prism

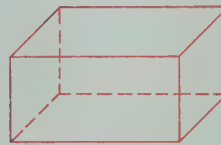
Draw a rectangle.



Draw another rectangle.



Connect the corners.
Dot the hidden edges.



Draw a rectangular prism here.

3. Rectangular Pyramid

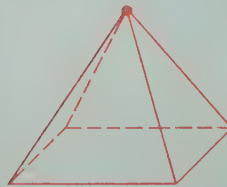
Draw a parallelogram.



Draw a dot above it.



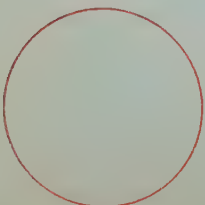
Connect the dot to the corners.
Dot the hidden edges.



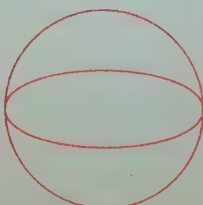
Draw a rectangular pyramid here.

4. Sphere

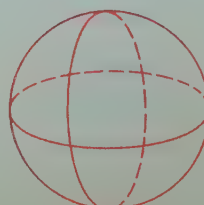
Draw a circle.



Draw an oval.



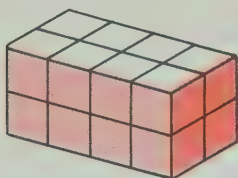
Draw another oval.
dot the hidden parts.



Draw a sphere here.

Give the correct number for each blank.

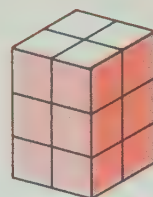
1.



_____ in each layer, _____ layers

Volume is _____ cubic units.

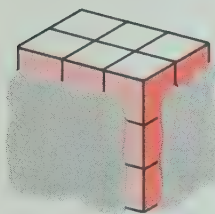
2.



_____ in each layer, _____ layers

Volume is _____ cubic units.

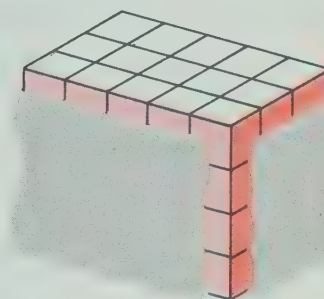
3.



_____ in each layer, _____ layers

Volume is _____ cubic units.

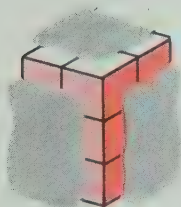
4.



_____ in each layer, _____ layers

Volume is _____ cubic units.

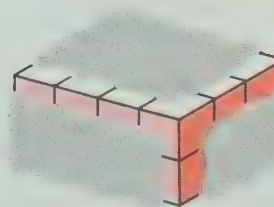
5.



_____ in each layer, _____ layers

Volume is _____ cubic units.

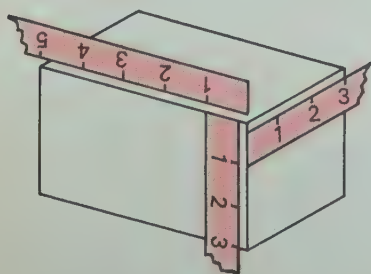
6.



_____ in each layer, _____ layers

Volume is _____ cubic units.

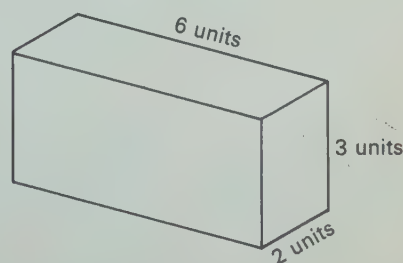
7.



_____ in each layer, _____ layers

Volume is _____ cubic units.

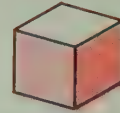
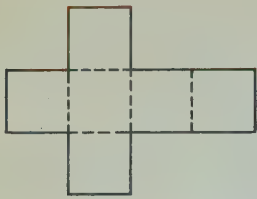
8.



_____ in each layer, _____ layers

Volume is _____ cubic units.

1.



The area of this region
is _____ square units.

Fold into a cube.

The **surface area** of this
cube is _____ square units

2. Each face of the blocks has a different letter. The blocks are glued together. If you could hold the figure, how many letters could you see? _____



The **surface area**
of this figure is
_____ square units ().

3. Give the surface area
of each figure.

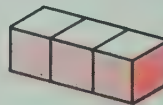
Use as your unit.

A



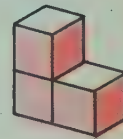
_____ square units

B



_____ square units

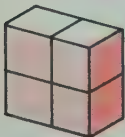
C



_____ square units

4. Find the volume and surface area of each figure.

A



Volume: _____ cubic units

Surface area: _____ square units

B



Volume: _____ cubic units

Surface area: _____ square units

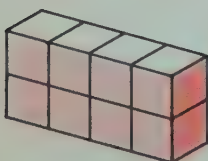
C



Volume: _____ cubic units

Surface area: _____ square units

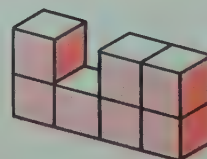
D



Volume: _____ cubic units

Surface area: _____ square units

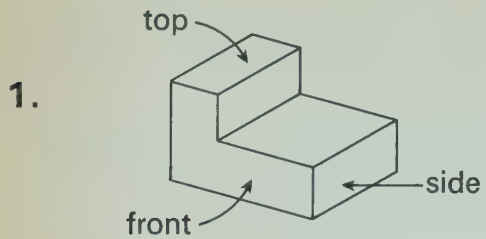
E



Volume: _____ cubic units

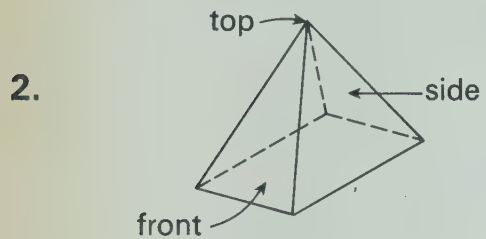
Surface area: _____ square units

A drawing of an object is given at the left. Three views are shown at the right. Give the correct word, **front**, **top**, or **side**, for each view.



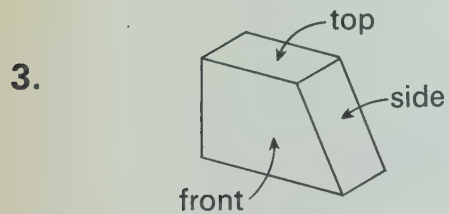




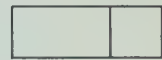


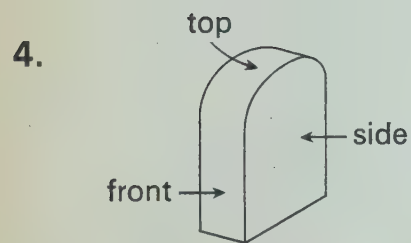








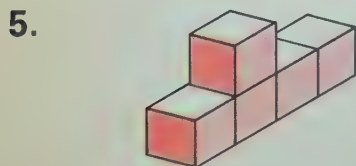








Draw the third view of the objects shown at the left.



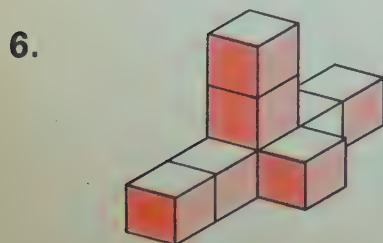
front



top



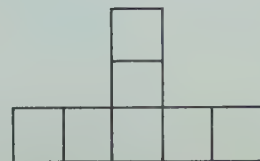
side



front



side

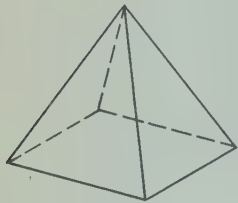


top

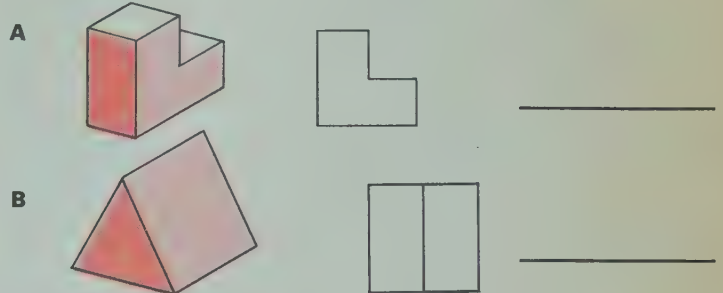
1. Put a ring around each space figure.



2. Name the figure.

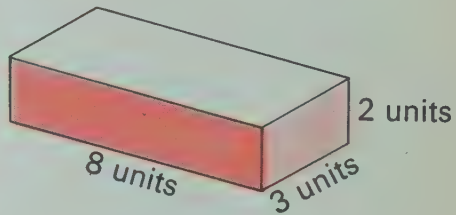


3. Tell whether the sketch to the right of the figure is a **front**, **top**, or **side** view.







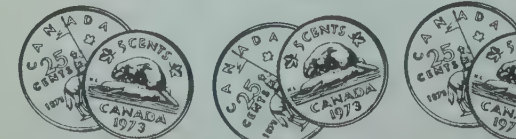



4. A The **volume** of the box is _____ cubic units.

B The **surface area** of the box is _____ square units.



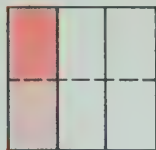
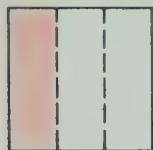
CHANGE OF PACE

In each exercise, there is the same number of each kind of coin.
Tell how many coins for each collection.

1. Pennies Nickels	<div>6¢</div> 	<div>6¢</div> 	Total value: 30¢ Number of coins _____
2. Dimes Nickels	<div>15¢</div> 	<div>15¢</div> 	Total value: \$1.50 Number of coins _____
3. Nickels Quarters			Total value: \$2.10 Number of coins _____
4. Dimes Nickels Quarters			Total value: \$4.00 Number of coins _____

1. Give the missing fractions. Then solve the equations.

A



We write

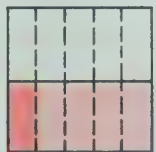
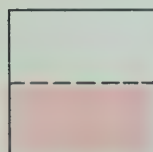
$$\frac{1}{2} \times \frac{1}{3} = \underline{\hspace{2cm}}$$

$\frac{1}{3}$ of the region
is shaded.

$\frac{1}{2}$ of $\frac{1}{3}$ is more
heavily shaded.

$\frac{1}{6}$ of the region is
more heavily shaded.

B



We write

$$\frac{1}{5} \times \frac{1}{2} = \underline{\hspace{2cm}}$$

$\frac{1}{2}$ of the region
is shaded.

$\frac{1}{2}$ of $\frac{1}{5}$ is more
heavily shaded.

$\frac{1}{5}$ of the region is
more heavily shaded.

C



We write

$$\frac{1}{3} \times \frac{1}{4} = \underline{\hspace{2cm}}$$

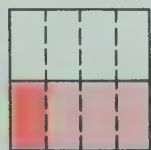
$\frac{1}{4}$ of the region
is shaded.

$\frac{1}{4}$ of $\frac{1}{4}$ is more
heavily shaded.

$\frac{1}{4}$ of the region is
more heavily shaded.

2. Study the figures. Then give the products.

A

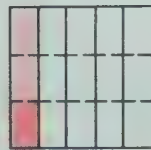


$$\frac{1}{2}$$

$$\frac{1}{4} \text{ of } \frac{1}{2}$$

$$\frac{1}{4} \times \frac{1}{2} = \underline{\hspace{2cm}}$$

B

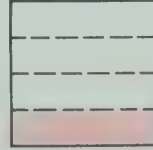


$$\frac{1}{5}$$

$$\frac{1}{3} \text{ of } \frac{1}{5}$$

$$\frac{1}{3} \times \frac{1}{5} = \underline{\hspace{2cm}}$$

C



$$\frac{1}{4}$$

$$\frac{1}{4} \text{ of } \frac{1}{4}$$

$$\frac{1}{4} \times \frac{1}{4} = \underline{\hspace{2cm}}$$

3. Solve the equations.

A $\frac{1}{2} \times \frac{1}{8} = \underline{\hspace{2cm}}$

B $\frac{1}{4} \times \frac{1}{6} = \underline{\hspace{2cm}}$

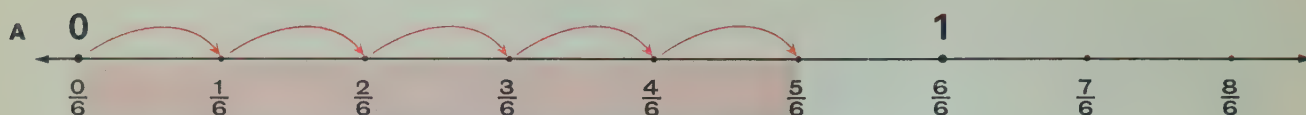
C $\frac{1}{5} \times \frac{1}{3} = \underline{\hspace{2cm}}$

D $\frac{1}{4} \times \frac{1}{5} = \underline{\hspace{2cm}}$

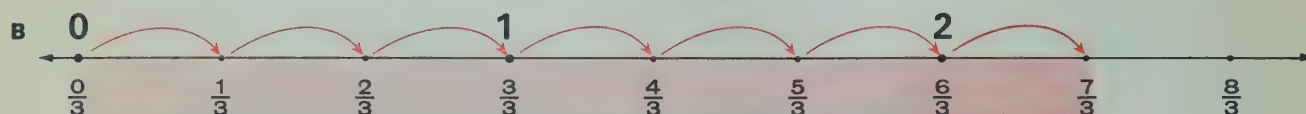
E $\frac{1}{6} \times \frac{1}{2} = \underline{\hspace{2cm}}$

F $\frac{1}{6} \times \frac{1}{9} = \underline{\hspace{2cm}}$

1. Give the missing fractions. Then solve the equations.



5 jumps of $\frac{1}{6}$ $5 \times \frac{1}{6} = \underline{\hspace{2cm}}$



7 jumps of $\frac{1}{3}$ $7 \times \frac{1}{3} = \underline{\hspace{2cm}}$



$\frac{1}{2}$ of $\frac{1}{4}$ $\frac{1}{2} \times \frac{1}{4} = \underline{\hspace{2cm}}$

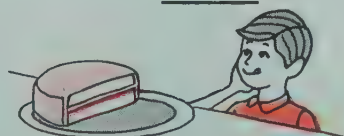
2. Solve the equations.

- | | | | |
|--|--|--|---|
| A $6 \times \frac{1}{5} = \underline{\hspace{2cm}}$ | C $7 \times \frac{1}{8} = \underline{\hspace{2cm}}$ | E $\frac{1}{4} \times \frac{1}{3} = \underline{\hspace{2cm}}$ | G $2 \times \frac{1}{8} = \underline{\hspace{2cm}}$ |
| B $3 \times \frac{1}{4} = \underline{\hspace{2cm}}$ | D $5 \times \frac{1}{2} = \underline{\hspace{2cm}}$ | F $\frac{1}{6} \times \frac{1}{4} = \underline{\hspace{2cm}}$ | H $\frac{1}{2} \times \frac{1}{10} = \underline{\hspace{2cm}}$ |

3. Solve each short story.

Track: $\frac{1}{4}$ km. Ran $\frac{1}{2}$ way around.

Ran what part of a km? $\underline{\hspace{2cm}}$



- B** $\frac{1}{2}$ a cake left after dinner. Next day Bob ate $\frac{1}{3}$ of what was left. What part of the cake did Bob eat? $\underline{\hspace{2cm}}$

- C** Pie cut into sixths. Dinner: served 5 pieces. Used what part of the pie for dinner? $\underline{\hspace{2cm}}$

- D** Dime: $\frac{1}{10}$ of a dollar. 7 dimes.

What part of a dollar? $\underline{\hspace{2cm}}$



- E** 50¢: $\frac{1}{2}$ of a dollar. $\frac{1}{2}$ of 50¢ what part of a dollar? $\underline{\hspace{2cm}}$
- F** Day: $\frac{1}{7}$ of a week. $\frac{1}{2}$ day is what part of a week? $\underline{\hspace{2cm}}$

1. Give the missing numbers.

A $\frac{3}{4} = \underline{\hspace{1cm}} \times \frac{1}{4}$

C $\frac{7}{8} = \underline{\hspace{1cm}} \times \frac{1}{8}$

E $\frac{5}{4} = 5 \times \underline{\hspace{1cm}}$

B $\frac{7}{12} = 7 \times \underline{\hspace{1cm}}$

D $\frac{9}{10} = 9 \times \underline{\hspace{1cm}}$

F $\frac{8}{7} = \underline{\hspace{1cm}} \times \frac{1}{7}$

2. Give the whole number for the box, the fraction for the screen, and the final product for the blank. Then solve the equation.

Find the product of these factors.

A $\frac{3}{4} \times \frac{2}{5} = (3 \times \frac{1}{4}) \times (2 \times \frac{1}{5}) = \boxed{\hspace{1cm}} \times \boxed{\hspace{1cm}} = \underline{\hspace{1cm}}$ $\frac{3}{4} \times \frac{2}{5} = \underline{\hspace{1cm}}$

Find the product of these factors.

B $\frac{2}{3} \times \frac{3}{8} = (2 \times \frac{1}{3}) \times (3 \times \frac{1}{8}) = \boxed{\hspace{1cm}} \times \boxed{\hspace{1cm}} = \underline{\hspace{1cm}}$ $\frac{2}{3} \times \frac{3}{8} = \underline{\hspace{1cm}}$

C $\frac{5}{6} \times \frac{2}{3} = (5 \times \frac{1}{6}) \times (2 \times \frac{1}{3}) = \boxed{\hspace{1cm}} \times \boxed{\hspace{1cm}} = \underline{\hspace{1cm}}$ $\frac{5}{6} \times \frac{2}{3} = \underline{\hspace{1cm}}$

D $\frac{7}{8} \times \frac{3}{4} = (7 \times \frac{1}{8}) \times (3 \times \frac{1}{4}) = \boxed{\hspace{1cm}} \times \boxed{\hspace{1cm}} = \underline{\hspace{1cm}}$ $\frac{7}{8} \times \frac{3}{4} = \underline{\hspace{1cm}}$

E $\frac{2}{3} \times \frac{2}{3} = (2 \times \frac{1}{3}) \times (2 \times \frac{1}{3}) = \boxed{\hspace{1cm}} \times \boxed{\hspace{1cm}} = \underline{\hspace{1cm}}$ $\frac{2}{3} \times \frac{2}{3} = \underline{\hspace{1cm}}$

F $\frac{3}{4} \times \frac{4}{5} = (3 \times \frac{1}{4}) \times (4 \times \frac{1}{5}) = \boxed{\hspace{1cm}} \times \boxed{\hspace{1cm}} = \underline{\hspace{1cm}}$ $\frac{3}{4} \times \frac{4}{5} = \underline{\hspace{1cm}}$

3. Find the products.

A $\frac{5}{2} \times \frac{3}{4} = (5 \times \frac{1}{2}) \times (3 \times \frac{1}{4}) = \underline{\hspace{1cm}}$ D $\frac{4}{5} \times \frac{2}{5} = (4 \times \frac{1}{5}) \times (2 \times \frac{1}{5}) = \underline{\hspace{1cm}}$

B $\frac{3}{4} \times \frac{5}{6} = (3 \times \frac{1}{4}) \times (5 \times \frac{1}{6}) = \underline{\hspace{1cm}}$ E $\frac{2}{3} \times \frac{3}{5} = (2 \times \frac{1}{3}) \times (3 \times \frac{1}{5}) = \underline{\hspace{1cm}}$

C $\frac{7}{8} \times \frac{2}{3} = (7 \times \frac{1}{8}) \times (2 \times \frac{1}{3}) = \underline{\hspace{1cm}}$ F $\frac{5}{8} \times \frac{2}{3} = (5 \times \frac{1}{8}) \times (2 \times \frac{1}{3}) = \underline{\hspace{1cm}}$

4. Find the products.

A $\frac{2}{7} \times \frac{3}{4} = \underline{\hspace{1cm}}$ D $\frac{5}{6} \times \frac{7}{8} = \underline{\hspace{1cm}}$ G $\frac{4}{3} \times \frac{3}{8} = \underline{\hspace{1cm}}$ J $\frac{7}{10} \times \frac{2}{3} = \underline{\hspace{1cm}}$

B $\frac{5}{6} \times \frac{2}{3} = \underline{\hspace{1cm}}$ E $\frac{3}{2} \times \frac{4}{5} = \underline{\hspace{1cm}}$ H $\frac{5}{8} \times \frac{6}{5} = \underline{\hspace{1cm}}$ K $\frac{6}{7} \times \frac{1}{5} = \underline{\hspace{1cm}}$

C $\frac{7}{8} \times \frac{2}{3} = \underline{\hspace{1cm}}$ F $\frac{1}{6} \times \frac{4}{5} = \underline{\hspace{1cm}}$ I $\frac{3}{8} \times \frac{5}{6} = \underline{\hspace{1cm}}$ L $\frac{4}{9} \times \frac{1}{2} = \underline{\hspace{1cm}}$

1. Give the product. Then give the quotient.

A $\frac{1}{3} \times \frac{1}{4} = \underline{\hspace{1cm}}$ $\rightarrow \frac{1}{12} \div \frac{1}{4} = \underline{\hspace{1cm}}$

F $\frac{2}{5} \times \frac{1}{4} = \underline{\hspace{1cm}}$ $\rightarrow \frac{2}{20} \div \frac{1}{4} = \underline{\hspace{1cm}}$

B $\frac{1}{5} \times \frac{2}{3} = \underline{\hspace{1cm}}$ $\rightarrow \frac{2}{15} \div \frac{2}{3} = \underline{\hspace{1cm}}$

G $\frac{3}{4} \times \frac{1}{5} = \underline{\hspace{1cm}}$ $\rightarrow \frac{3}{20} \div \frac{1}{5} = \underline{\hspace{1cm}}$

C $\frac{3}{4} \times \frac{1}{2} = \underline{\hspace{1cm}}$ $\rightarrow \frac{3}{8} \div \frac{1}{2} = \underline{\hspace{1cm}}$

H $\frac{1}{7} \times \frac{3}{5} = \underline{\hspace{1cm}}$ $\rightarrow \frac{3}{35} \div \frac{3}{5} = \underline{\hspace{1cm}}$

D $\frac{1}{3} \times \frac{2}{5} = \underline{\hspace{1cm}}$ $\rightarrow \frac{2}{15} \div \frac{2}{5} = \underline{\hspace{1cm}}$

I $\frac{2}{7} \times \frac{5}{2} = \underline{\hspace{1cm}}$ $\rightarrow \frac{10}{14} \div \frac{5}{2} = \underline{\hspace{1cm}}$

E $\frac{3}{8} \times \frac{1}{2} = \underline{\hspace{1cm}}$ $\rightarrow \frac{3}{16} \div \frac{1}{2} = \underline{\hspace{1cm}}$

J $\frac{6}{5} \times \frac{2}{3} = \underline{\hspace{1cm}}$ $\rightarrow \frac{12}{15} \div \frac{2}{3} = \underline{\hspace{1cm}}$

2. Solve the equations.

A $\underline{\hspace{1cm}} \times \frac{1}{4} = \frac{3}{8}$

D $\underline{\hspace{1cm}} \times \frac{2}{3} = \frac{2}{12}$

G $\underline{\hspace{1cm}} \times \frac{1}{4} = \frac{1}{16}$

J $\underline{\hspace{1cm}} \times \frac{3}{2} = \frac{9}{4}$

$\frac{3}{8} \div \frac{1}{4} = \underline{\hspace{1cm}}$

$\frac{2}{12} \div \frac{2}{3} = \underline{\hspace{1cm}}$

$\frac{1}{16} \div \frac{1}{4} = \underline{\hspace{1cm}}$

$\frac{9}{4} \div \frac{3}{2} = \underline{\hspace{1cm}}$

B $\underline{\hspace{1cm}} \times \frac{2}{5} = \frac{4}{15}$

E $\underline{\hspace{1cm}} \times \frac{5}{6} = \frac{10}{18}$

H $\underline{\hspace{1cm}} \times \frac{2}{5} = \frac{6}{40}$

K $\underline{\hspace{1cm}} \times \frac{4}{3} = \frac{12}{12}$

$\frac{4}{15} \div \frac{2}{5} = \underline{\hspace{1cm}}$

$\frac{10}{18} \div \frac{5}{6} = \underline{\hspace{1cm}}$

$\frac{6}{40} \div \frac{2}{5} = \underline{\hspace{1cm}}$

$\frac{12}{12} \div \frac{4}{3} = \underline{\hspace{1cm}}$

C $\underline{\hspace{1cm}} \times \frac{1}{2} = \frac{3}{8}$

F $\underline{\hspace{1cm}} \times \frac{3}{8} = \frac{6}{40}$

I $\underline{\hspace{1cm}} \times \frac{6}{5} = \frac{6}{10}$

L $\underline{\hspace{1cm}} \times \frac{7}{8} = \frac{7}{16}$

$\frac{3}{8} \div \frac{1}{2} = \underline{\hspace{1cm}}$

$\frac{6}{40} \div \frac{3}{8} = \underline{\hspace{1cm}}$

$\frac{6}{10} \div \frac{6}{5} = \underline{\hspace{1cm}}$

$\frac{7}{16} \div \frac{7}{8} = \underline{\hspace{1cm}}$

3. Solve each short story problem.

A $\frac{3}{4}$ litre of milk for one cake. How much milk is needed for 5 cakes?

D Dime: $\frac{1}{10}$ of a dollar. 3 dimes.

What part of a dollar?

B $\frac{2}{3}$ litre of shortening for 1 cake. How much shortening

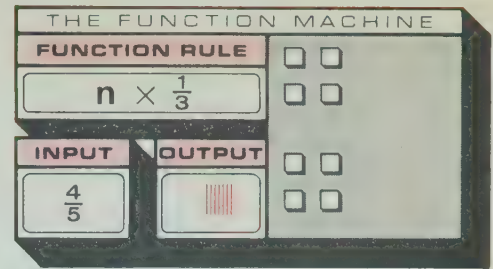
for $\frac{1}{2}$ a cake?

E Lot: $\frac{3}{4}$ of a hectare.
Backyard: $\frac{2}{3}$ of the lot. What part of a hectare is the backyard?

C 1 glass: $\frac{1}{4}$ litre. What part of a litre is $\frac{1}{3}$ glass?

F 4 sticks of butter: 1 package. How many sticks in 2 packages?

1. Think about the function machine at the right to complete each sentence.



- A When the input number n is $\frac{4}{5}$, the output number is _____.
- B When n is $\frac{1}{2}$, the output number is _____.
- C When n is 7, the output number is _____.

Complete the function tables.

2. **Function Rule**

$n \times \frac{1}{2}$	
n	Output
5	$2\frac{1}{2}$
$\frac{3}{4}$	$\frac{3}{8}$
A $\frac{1}{2}$	
B 8	
C $\frac{4}{3}$	
D 2	1

3. **Function Rule**

$n \times 3$	
n	Output
6	18
A $\frac{2}{5}$	
B $\frac{1}{8}$	
C $\frac{1}{3}$	
D $\frac{2}{7}$	
E $\frac{1}{6}$	

4. **Function Rule**

$n \times \frac{2}{5}$	
n	Output
4	
A 1	
B $\frac{1}{3}$	
C 10	
D $\frac{5}{2}$	
E $\frac{3}{4}$	

5. **Function Rule**

$n \times \frac{3}{4}$	
n	Output
3	
A 8	
B $\frac{1}{2}$	
C $\frac{2}{3}$	
D $\frac{7}{8}$	
E $\frac{4}{3}$	

6. **Function Rule**

$n + \frac{2}{3}$	
n	Output
$1\frac{1}{6}$	$1\frac{5}{6}$
A 3	
B $10\frac{1}{3}$	
C $\frac{2}{3}$	
D $4\frac{1}{2}$	
E $\frac{5}{6}$	

7. **Function Rule**

$n - \frac{3}{5}$	
n	Output
8	$7\frac{2}{5}$
A 3	
B $1\frac{9}{10}$	
C $3\frac{1}{2}$	
D 1	
E $\frac{7}{10}$	

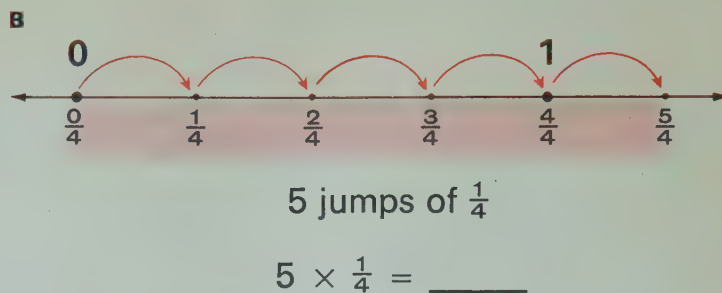
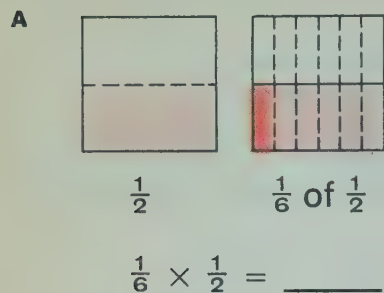
8. **Function Rule**

$n \div \frac{1}{2}$	
n	Output
1	2
A 2	
B $\frac{1}{2}$	
C $\frac{2}{3}$	
D $\frac{3}{4}$	
E $\frac{3}{7}$	

9. **Function Rule**

$n \times \frac{5}{9}$	
n	Output
3	$1\frac{2}{3}$
A $\frac{1}{5}$	
B $\frac{3}{4}$	
C $\frac{1}{2}$	
D $\frac{3}{10}$	
E $4\frac{1}{2}$	

1. Solve the equations.



2. Find the products.

A $5 \times \frac{1}{8} = \underline{\hspace{2cm}}$ **B** $\frac{1}{4} \times \frac{1}{3} = \underline{\hspace{2cm}}$ **C** $6 \times \frac{1}{5} = \underline{\hspace{2cm}}$ **D** $7 \times \frac{1}{2} = \underline{\hspace{2cm}}$

3. Find the products.

A $\frac{2}{3} \times \frac{3}{4} = \underline{\hspace{2cm}}$ **D** $\frac{5}{2} \times \frac{3}{4} = \underline{\hspace{2cm}}$ **G** $\frac{3}{8} \times \frac{2}{5} = \underline{\hspace{2cm}}$ **J** $\frac{1}{4} \times \frac{7}{10} = \underline{\hspace{2cm}}$

B $\frac{5}{6} \times \frac{1}{7} = \underline{\hspace{2cm}}$ **E** $\frac{4}{3} \times \frac{1}{8} = \underline{\hspace{2cm}}$ **H** $\frac{7}{4} \times \frac{2}{3} = \underline{\hspace{2cm}}$ **K** $\frac{5}{6} \times \frac{3}{8} = \underline{\hspace{2cm}}$

C $\frac{1}{3} \times \frac{4}{5} = \underline{\hspace{2cm}}$ **F** $\frac{7}{10} \times \frac{2}{3} = \underline{\hspace{2cm}}$ **I** $\frac{3}{5} \times 2 = \underline{\hspace{2cm}}$ **L** $\frac{8}{3} \times \frac{3}{10} = \underline{\hspace{2cm}}$

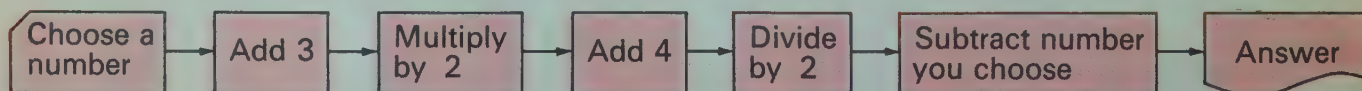
4. Since $\frac{3}{7} \times \frac{2}{5} = \frac{6}{35}$, we know that $\frac{6}{35} \div \frac{2}{5} = \underline{\hspace{2cm}}$.

5. Find the quotients.

A $\frac{3}{15} \div \frac{3}{5} = \underline{\hspace{2cm}}$ **B** $\frac{3}{4} \div \frac{1}{2} = \underline{\hspace{2cm}}$ **C** $\frac{7}{10} \div \frac{1}{5} = \underline{\hspace{2cm}}$ **D** $\frac{4}{9} \div \frac{2}{3} = \underline{\hspace{2cm}}$

CHANGE OF PACE

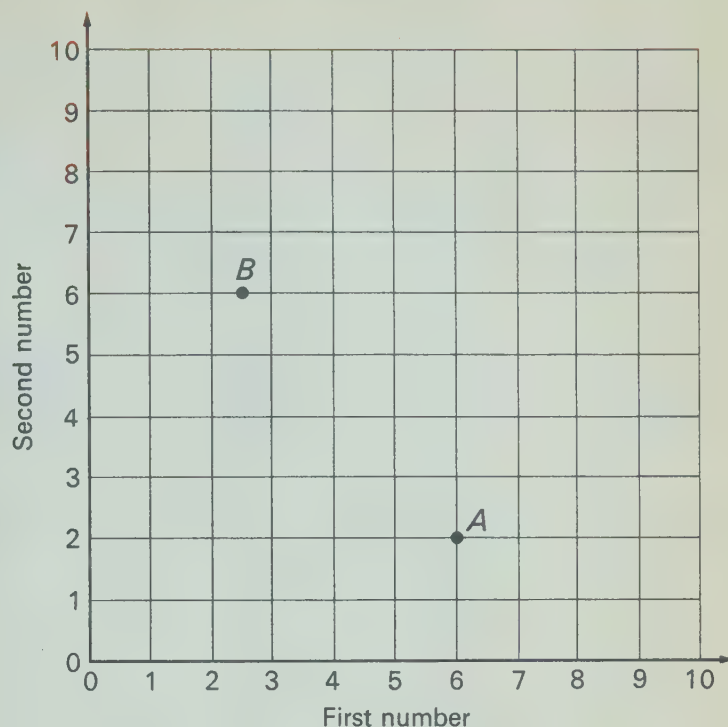
Follow the directions in the flow chart.



If you follow the directions in the flow chart carefully, your answer should be 5 no matter what number you chose. Try several numbers and see.

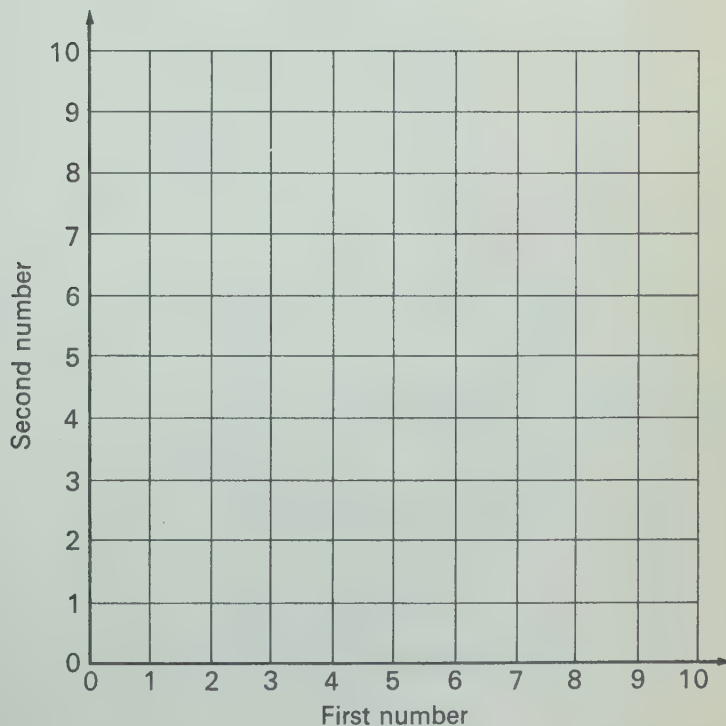
1. Use the grid at the right to graph each of these points. Write the letter beside it. Parts **A** and **B** are completed as examples.

A	(6, 2)	G	(0, 4)
B	(2 $\frac{1}{2}$, 6)	H	(6 $\frac{1}{2}$, 0)
C	(5, 1)	I	(3, 3)
D	(1, 5)	J	(5 $\frac{1}{2}$, 5 $\frac{1}{2}$)
E	(3, 7)	K	(0, 0)
F	(7, 3 $\frac{1}{2}$)	L	(4 $\frac{1}{2}$, 0)



2. Graph and connect these points in the order given.

(0, 6) → (2, 7) →
 (3, 7) → (4, 8) →
 (6, 8) → (5, 7) →
 (7, 7) → (9, 9) →
 (9, 3) → (7, 4) →
 (5, 3) → (3, 3) →
 (0, 4) → (2 $\frac{1}{2}$, 4) →
 (0, 5) → (0, 6).



1. How will the figure look after a $\frac{1}{2}$ clockwise rotation?
Ring the letter of the correct figure.

Start



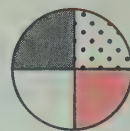
A



B



C



D



2. How will the figure look after a $\frac{1}{4}$ clockwise rotation?
Ring the letter of the correct figure.

Start



A



B



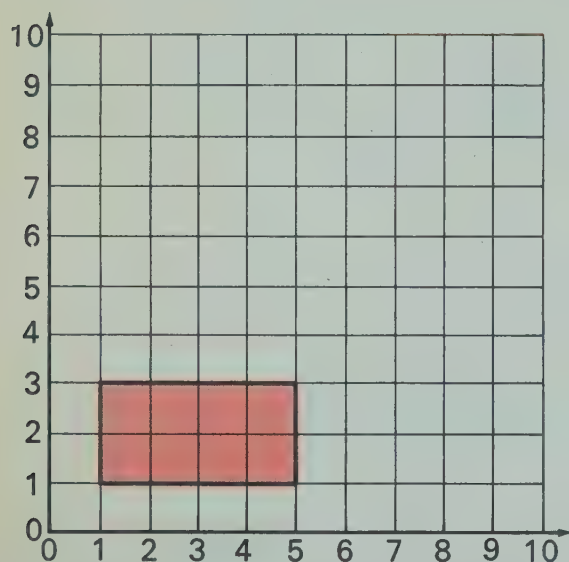
C



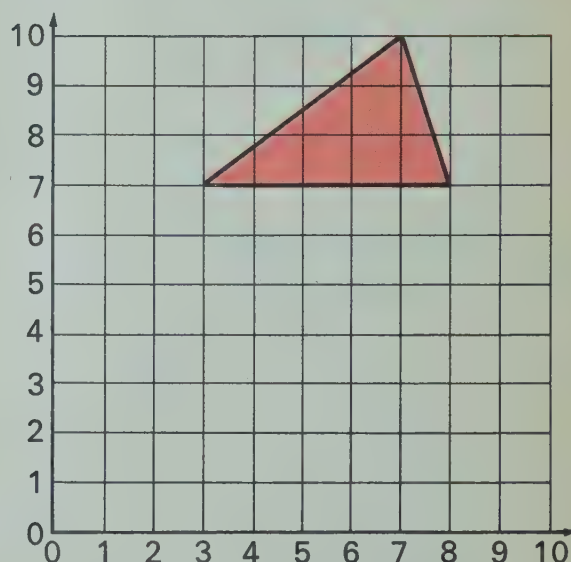
D



3. Show the new position of the rectangle after a translation of **right 4, up 6**.



4. Show the position of the triangle after a translation of **left 2, down 4**.

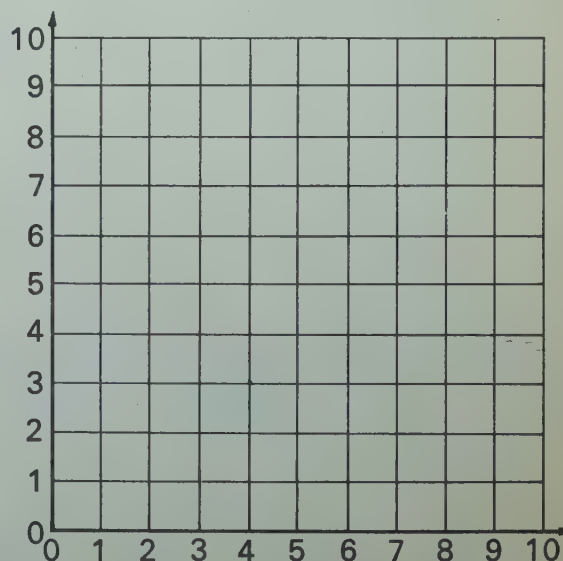


5. Use the grid at the right to complete each part.

A Draw a triangle with vertices at (2, 2), (5, 2), and (4, 4).

B Double the co-ordinates of each number pair in part A.

C Draw a larger similar triangle using the co-ordinates in part B.



● Graphing Functions and Positive Negative Numbers

1. Complete the function table, and write the co-ordinates as number pairs. Then graph the co-ordinates. The first entry is completed as an example.

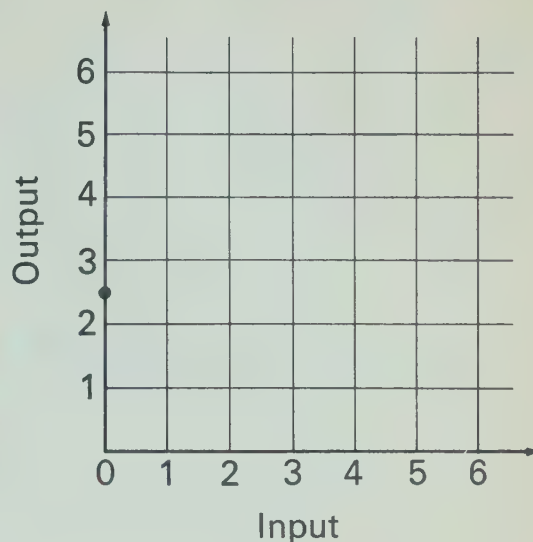
Function table

function rule	
$n + 2\frac{1}{2}$	
Input (n)	Output
0	$2\frac{1}{2}$
$\frac{1}{2}$	
1	
$1\frac{1}{2}$	
2	
$2\frac{1}{2}$	
3	

Number pairs

(0 , $2\frac{1}{2}$)
 (__ , __)
 (__ , __)
 (__ , __)
 (__ , __)
 (__ , __)
 (__ , __)

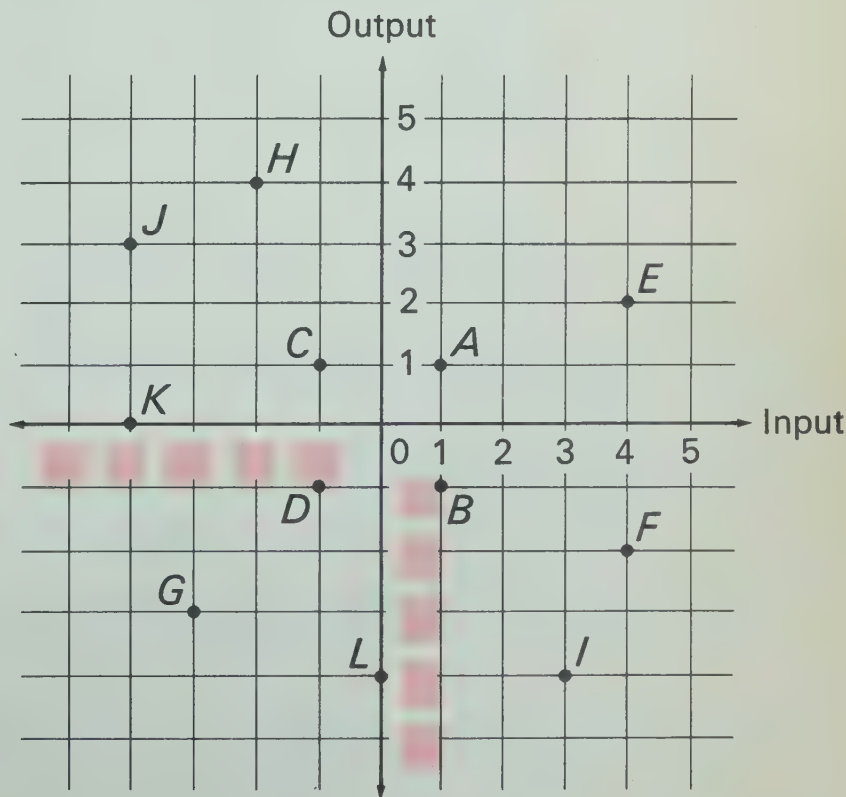
Graph of the number pairs



2. A The **positive** numbers to 5 are shown on the axes. Write the correct **negative** numbers in the red screens.

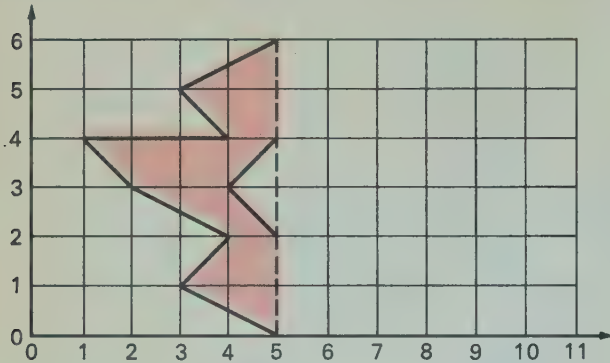
- B Give the co-ordinates for the points A through L.

A (__ , __) G (__ , __)
 B (__ , __) H (__ , __)
 C (__ , __) I (__ , __)
 D (__ , __) J (__ , __)
 E (__ , __) K (__ , __)
 F (__ , __) L (__ , __)

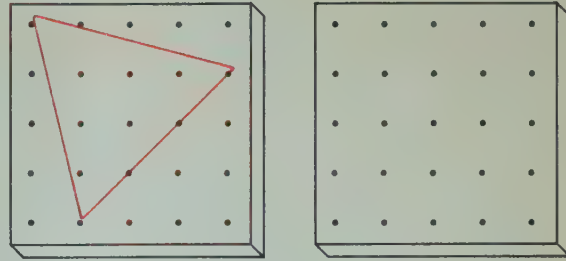


- c Graph the following co-ordinates and label with the letter given.
 $M(1, 2)$; $N(1, -2)$; $P(-1, 2)$; $Q(-1, -2)$; $R(4, 5)$; $S(4, -5)$; $T(-2, -4)$; $V(-5, 5)$

1. Draw the other half of the figure so that it will be **symmetric**.

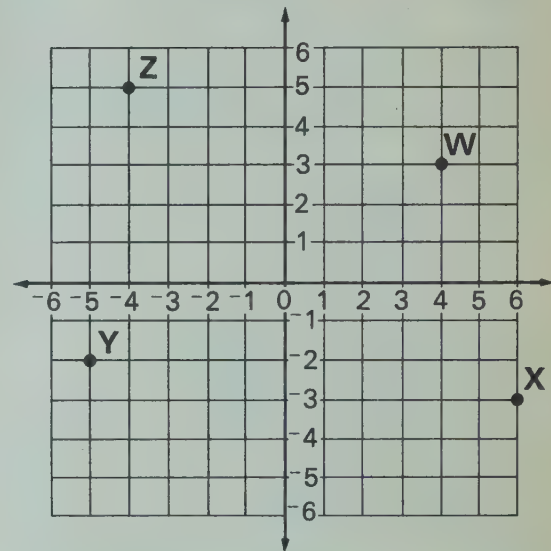


2. Show how the geoboard would look after a $\frac{3}{4}$ clockwise rotation.



3. Give the number pairs for the points shown on the graph at the right.

W _____ X _____
Y _____ Z _____



4. Graph the following number pairs. Label each point with the letter beside it.

A (4, 2) C (3, $1\frac{1}{2}$) E (-2, 5)
B (2, 4) D (6, -6) F (-3, -4)

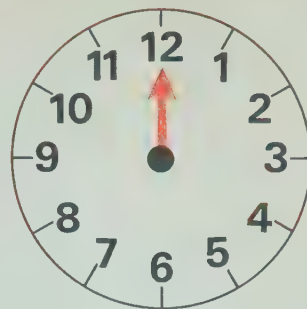
CHANGE OF PACE

For each exercise below, pretend you are blindfolded when you take beads from the box.

- Would it be possible to take out 100 black beads before you take a colored bead? _____
- How many beads do you need to take from the box to be sure you have 2 of the same color? _____
- How many beads do you need to take to be sure you have 2 that are of different colors? _____
- Suppose you take a handful of beads after shaking the box thoroughly. You count the beads and find that you have removed 30 beads. How many of the 30 beads would you expect to be colored? _____



1. The clock at the right has only an hour hand. Refer to this clock to complete each clock sentence. Then complete each clock equation.



Clock sentence

Clock equation

- | | | | |
|---|---|---|--------------------------------------|
| A | 2 hours after 9 o'clock is _____ o'clock. | → | $9 + 2 = \underline{\hspace{2cm}}$ |
| B | 3 hours after 9 o'clock is _____ o'clock. | → | $9 + 3 = \underline{\hspace{2cm}}$ |
| C | 4 hours after 9 o'clock is _____ o'clock. | → | $9 + 4 = \underline{\hspace{2cm}}$ |
| D | 6 hours after 8 o'clock is _____ o'clock. | → | $8 + 6 = \underline{\hspace{2cm}}$ |
| E | 8 hours after 6 o'clock is _____ o'clock. | → | $6 + 8 = \underline{\hspace{2cm}}$ |
| F | 5 hours after 8 o'clock is _____ o'clock. | → | $8 + 5 = \underline{\hspace{2cm}}$ |
| G | 12 hours after 11 o'clock is _____ o'clock. | → | $11 + 12 = \underline{\hspace{2cm}}$ |

2. Think about the clock above to complete the sentences in the column on the left. Then match each sentence in the left column with an equation in the right column. Finally, complete the equations in the right column.

- | | | |
|---|--|-------------------------------------|
| A | 4 hours after 11 o'clock is _____ o'clock. | $4 + 11 = \underline{\hspace{2cm}}$ |
| B | 10 hours after 4 o'clock is _____ o'clock. | $11 + 4 = \underline{\hspace{2cm}}$ |
| C | 11 hours after 4 o'clock is _____ o'clock. | $10 + 4 = \underline{\hspace{2cm}}$ |
| D | 4 hours after 10 o'clock is _____ o'clock. | $4 + 10 = \underline{\hspace{2cm}}$ |

3. Find the sums using clock arithmetic.

A
$$\begin{array}{r} 6 \\ + 7 \\ \hline \end{array}$$

B
$$\begin{array}{r} 2 \\ + 11 \\ \hline \end{array}$$

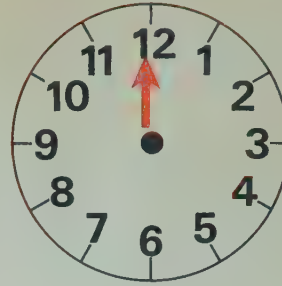
C
$$\begin{array}{r} 7 \\ + 8 \\ \hline \end{array}$$

D
$$\begin{array}{r} 9 \\ + 5 \\ \hline \end{array}$$

E
$$\begin{array}{r} 6 \\ 3 \\ + 5 \\ \hline \end{array}$$

F
$$\begin{array}{r} 9 \\ 1 \\ + 7 \\ \hline \end{array}$$

1. Complete each clock sentence. Then complete each clock equation. The clock face at the right may help you.



Clock sentence

Clock equation

- A 2 hours before 3 o'clock is _____ o'clock. $\rightarrow 3 - 2 = \underline{\hspace{1cm}}$
- B 3 hours before 3 o'clock is _____ o'clock. $\rightarrow 3 - 3 = \underline{\hspace{1cm}}$
- C 4 hours before 3 o'clock is _____ o'clock. $\rightarrow 3 - 4 = \underline{\hspace{1cm}}$
- D 8 hours before 5 o'clock is _____ o'clock. $\rightarrow 5 - 8 = \underline{\hspace{1cm}}$
- E 5 hours before 8 o'clock is _____ o'clock. $\rightarrow 8 - 5 = \underline{\hspace{1cm}}$
- F 7 hours before 9 o'clock is _____ o'clock. $\rightarrow 9 - 7 = \underline{\hspace{1cm}}$
- G 10 hours before 2 o'clock is _____ o'clock. $\rightarrow 2 - 10 = \underline{\hspace{1cm}}$

2. Think about **starting at 12 o'clock**. Complete the sentence and the equation.

- A After 4 three-hour periods pass, it is _____ o'clock. $\rightarrow 4 \times 3 = \underline{\hspace{1cm}}$
- B After 5 three-hour periods pass, it is _____ o'clock. $\rightarrow 5 \times 3 = \underline{\hspace{1cm}}$
- C After 6 five-hour periods pass, it is _____ o'clock. $\rightarrow 6 \times 5 = \underline{\hspace{1cm}}$
- D After 4 six-hour periods pass, it is _____ o'clock. $\rightarrow 4 \times 6 = \underline{\hspace{1cm}}$

3. Solve each clock equation.

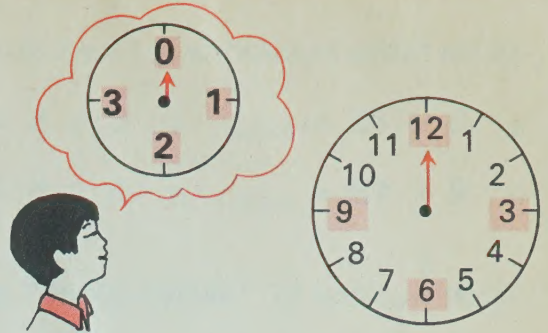
- A $7 - 5 = \underline{\hspace{1cm}}$ C $9 + 10 = \underline{\hspace{1cm}}$ E $6 + 8 = \underline{\hspace{1cm}}$
- B $4 + 11 = \underline{\hspace{1cm}}$ D $7 - 10 = \underline{\hspace{1cm}}$ F $1 - 9 = \underline{\hspace{1cm}}$

4. Solve each multiplication clock equation. Start at 12 o'clock.

- A $6 \times 3 = \underline{\hspace{1cm}}$ C $3 \times 5 = \underline{\hspace{1cm}}$ E $6 \times 6 = \underline{\hspace{1cm}}$
- B $8 \times 5 = \underline{\hspace{1cm}}$ D $7 \times 2 = \underline{\hspace{1cm}}$ F $10 \times 4 = \underline{\hspace{1cm}}$

1. Brian thought about 3, 6, 9, and 12 o'clock and invented a new clock. Ordinary clock arithmetic uses the whole numbers 1 through 12. What numbers are used in Brian's

arithmetic? _____



2. Complete each sentence and each equation using Brian's "four-clock" arithmetic.

- A 2 "hours" after 0 o'clock is _____ o'clock. $\rightarrow 0 + 2 = \underline{\hspace{1cm}}$
 B 0 "hours" after 2 o'clock is _____ o'clock. $\rightarrow 2 + 0 = \underline{\hspace{1cm}}$
 C 2 "hours" after 2 o'clock is _____ o'clock. $\rightarrow 2 + 2 = \underline{\hspace{1cm}}$
 D 3 "hours" before 2 o'clock is _____ o'clock. $\rightarrow 2 - 3 = \underline{\hspace{1cm}}$
 E 3 "hours" before 3 o'clock is _____ o'clock. $\rightarrow 3 - 3 = \underline{\hspace{1cm}}$
 F 2 "hours" after 1 o'clock is _____ o'clock. $\rightarrow 1 + 2 = \underline{\hspace{1cm}}$

3. Solve each "four-clock" equation.

- A $2 + 3 = \underline{\hspace{1cm}}$ C $3 - 1 = \underline{\hspace{1cm}}$ E $0 - 1 = \underline{\hspace{1cm}}$
 B $3 + 0 = \underline{\hspace{1cm}}$ D $1 - 3 = \underline{\hspace{1cm}}$ F $1 - 2 = \underline{\hspace{1cm}}$

4. A What number in "twelve-clock" arithmetic acts like zero does when we add it to a whole number? _____
 B What number in "four-clock" arithmetic acts like zero? _____

5. Solve these equations using "four-clock" arithmetic.

- A $1 + 2 = \underline{\hspace{1cm}}$ B $2 + 3 = \underline{\hspace{1cm}}$ C $3 + 1 = \underline{\hspace{1cm}}$ D $0 + 3 = \underline{\hspace{1cm}}$
 $2 + 1 = \underline{\hspace{1cm}}$ $3 + 2 = \underline{\hspace{1cm}}$ $1 + 3 = \underline{\hspace{1cm}}$ $3 + 0 = \underline{\hspace{1cm}}$

6. Which basic principle is suggested by exercise 5? _____

7. Solve these "four-clock" equations.

- A $(1 + 2) + 3 = \underline{\hspace{1cm}}$ B $(3 + 0) + 1 = \underline{\hspace{1cm}}$ C $(3 + 3) + 2 = \underline{\hspace{1cm}}$
 $1 + (2 + 3) = \underline{\hspace{1cm}}$ $3 + (0 + 1) = \underline{\hspace{1cm}}$ $3 + (3 + 2) = \underline{\hspace{1cm}}$

8. Which basic principle is suggested by exercise 7? _____

1. Solve these equations in "twelve-clock" arithmetic.

A $8 + 12 = \underline{\quad}$ C $8 + 5 = \underline{\quad}$ E $1 - 3 = \underline{\quad}$ G $7 - 8 = \underline{\quad}$
 B $8 \times 12 = \underline{\quad}$ D $3 \times 5 = \underline{\quad}$ F $6 + 6 = \underline{\quad}$ H $12 + 12 = \underline{\quad}$

2. What number in "twelve-clock" arithmetic is like zero? $\underline{\quad}$

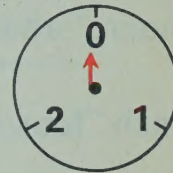
3. Solve these equations in "four-clock" arithmetic.

A $2 + 1 = \underline{\quad}$ C $2 + 2 = \underline{\quad}$ E $0 - 3 = \underline{\quad}$ G $2 - 3 = \underline{\quad}$
 B $0 + 3 = \underline{\quad}$ D $3 + 1 = \underline{\quad}$ F $3 - 1 = \underline{\quad}$ H $3 + 3 = \underline{\quad}$

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4. Here are all the possible addition equations that can be written for "three-clock" arithmetic. Solve them. The clock at the right may help you.

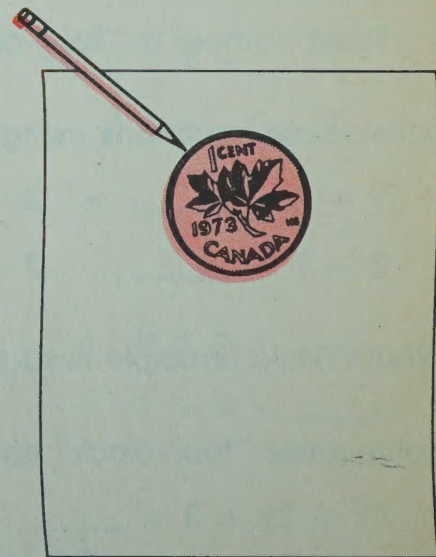
A $0 + 0 = \underline{\quad}$ D $1 + 0 = \underline{\quad}$ G $2 + 1 = \underline{\quad}$
 B $0 + 1 = \underline{\quad}$ E $2 + 0 = \underline{\quad}$ H $1 + 1 = \underline{\quad}$
 C $0 + 2 = \underline{\quad}$ F $1 + 2 = \underline{\quad}$ I $2 + 2 = \underline{\quad}$



5. Does the commutative principle hold true for "three-clock" arithmetic? $\underline{\quad}$

CHANGE OF PACE

On a sheet of notebook paper, draw around a penny, and cut out the penny-sized, circular region. Now pass a **nickel** and a **quarter** (or cardboard circles traced from the pictures below) through the penny-sized hole **without tearing the paper**. Can you do this with a **half dollar**?





* 000028386712 *

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